FIGHTING CORROSION

A 60-page section featuring the latest in corrosion-whipping methods and developments 37

For Men Who Manage

JULY 1957

chemical processing

A PUTMAN PUBLICATION / Executive Magazines for Industry

Dr. W. F. Fair, Jr.

NACE President, 1956-57 and Koppers Co. Coatings Consultant looks at corrosion control training and trends 38

Is the Kefauver-Patman Amendment a MILLSTONE FOR COMPETITION?

Here's what the bill's authors and the Department of Justice say 24

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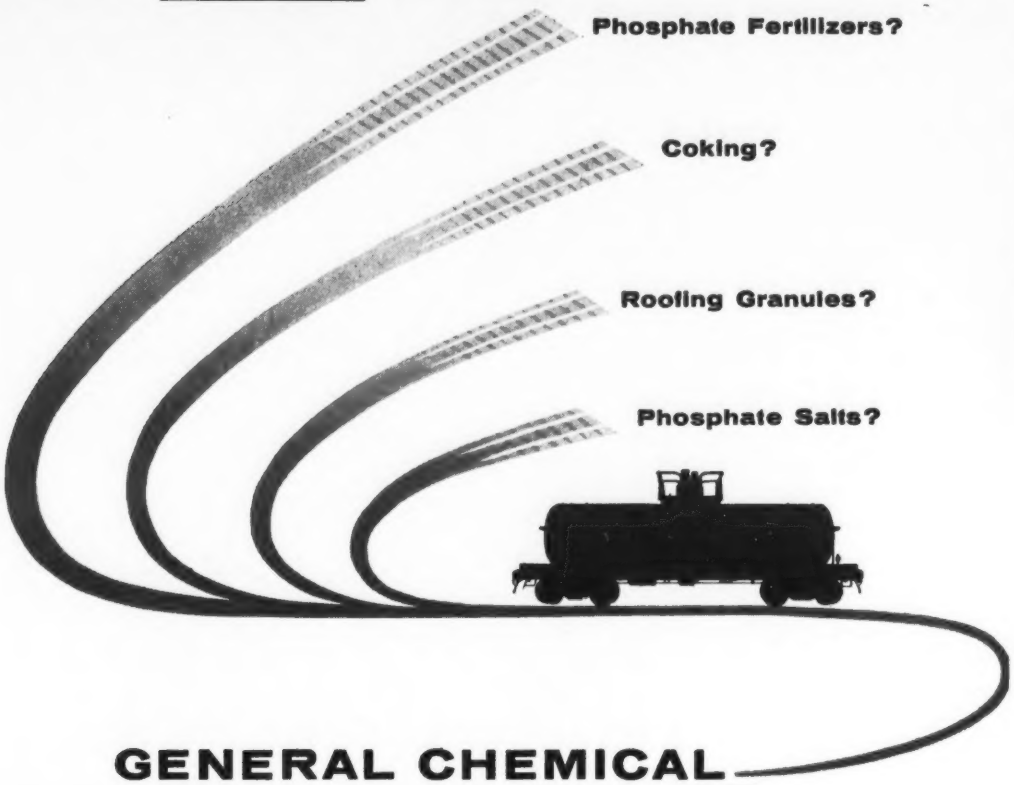

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When inquiring check 4410 opposite last page

that's interesting

The 'Lighter' Side

Could Cleopatra show Julius Caesar through the pyramids with a flashlight? She could if the bulb were available because up-and-coming Baghdad silversmiths were gold-plating jewelry . . . using electric batteries. The batteries, originally discovered by a German archeologist and recently reported in America by science-historian, Willy Ley, were used by the Parthians between 250 BC and 224 AD. (*The Laboratory,* Fisher Scientific)

Substitute for snow?

In distant Baffin Land in the northeast Arctic a Styrofoam igloo has withstood all that the north can hurl. In winds of 85 mph and temperatures to −40°F and below, the igloo has been equal to customary snow model. However, cost of $450, and scarcity of plastic in northland wastes make prospects of finding customers among Eskimos somewhat slim. (*Denver Post*)

Old sol at work

Drying sugar cane candy by solar energy is being studied by a Puerto Rican manufacturer. Flat-plate collectors to produce air at 160°F are being considered to replace oil-fired furnaces. Technical and economic feasibility of using abundant sunshine as an energy source for a variety of applications is under scrutiny. (*SRI Journal,* Standford Research Institute)

"Well our 'wrinkle reader' is really designed for textiles, but . . ."

Wrinkled! How much?

An optical device developed by a Columbia University scientist can measure extent to which any fabric is wrinkled. Probe movements over wrinkles deflects a light beam from face of a photoelectric cell giving direct voltmeter readings along test line. (*Columbia Research News*)

Clothes of the future

Non-woven, microfiber fabrics that can be sprayed on a form, hold promise of being the "throw away" clothes of the future. Process, using plastics or rubber, eliminate many steps in making clothes. Fabric "breathes" and can be highly absorbent. (*The Little Acorn,* Arthur D. Little, Inc.)

Atomic glow

A continuous light-emitting device which is unaffected by climate, moisture, temperature, or other external factors utilizes an essentially nonhazardous radio-isotope. With light from one of these atomic flashlights it is possible to read a map in total darkness Light loses only half of its brightness in 12 years.

(Atomlight is available from New England Nuclear Corp., Dept. CP, 575 Albany St., Boston 18, Mass. . . . or check 4410A opposite last page.)

Turn to next page

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THAT'S INTERESTING

Power boost?

A powerful bit of radioactive gold can increase burning speed of fuel by 50%. Tests at the University of Michigan involved burning speed of propane gas after exposure to 10,000 curie radiation source. Smaller engines with a radioactive "booster" may be doing the work of much larger units in the future.

Polyethylene's atomic future?

Molded blocks of linear, high-tensile, high-strength polyethylene can be a valuable, weight-saving replacement for lead during neutron shielding in atomic reactors. Void-free block, 10 x 12 x 9", weighs 40 lb. Material compounded with metallic boron enhances shielding characteristics.

Riding on nylon

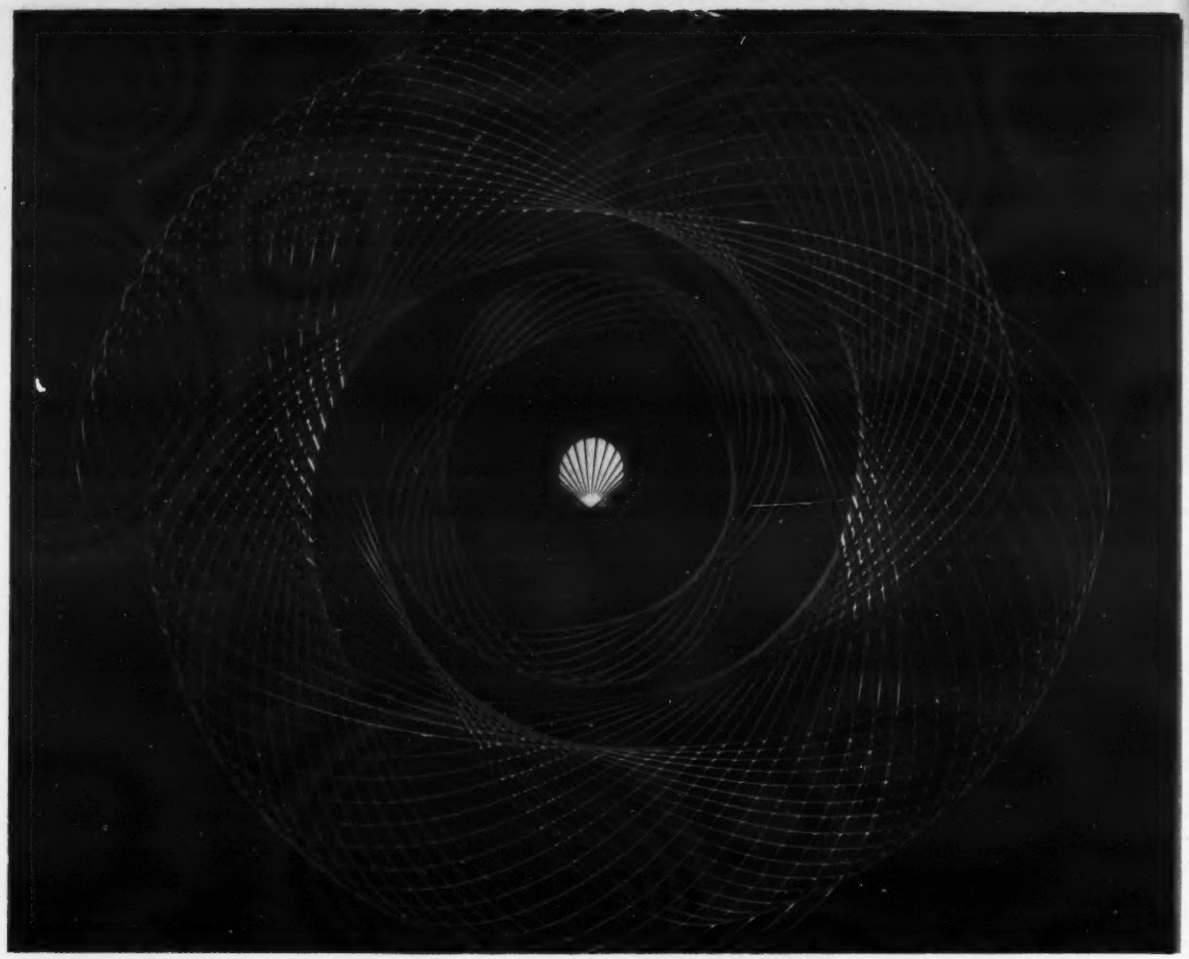
In 1956, all the nation's leading airlines were riding 100% on nylon-cord tires. Conventional cord had been replaced by nylon in virtually all off-the-road equipment. Approximately 30 to 35% of trucks and buses were rolling on nylon cord and 25% of replacement passenger car tires were nylon-cord reinforced.

Aerosol electronics aid

A timesaving product for ferreting out capacitors, resistors, transistors, and similar components which work when cool but fail when heated in operation is now available. Push-button aerosol package is used to spray suspected parts until frost forms one at a time. If the circuit begins to operate, sprayed part usually is the source of trouble.

Have you noticed the "Executive Size"?

Look opposite page 87



"Integration," an impression by C. Arthur Rosser

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chemical processing

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and Chemical Business

for men who manage

Vol. 20 July 1957 No. 7

CHEMICAL PROCESSING Magazine serves American industry wherever chemicals and chemical processes are involved

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chemical processing

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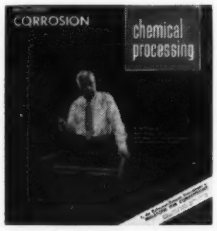
THIS MONTH'S COVER

. . . shows top corrosion engineer, Dr. W. F. Fair, Jr., checking specimens at the Koppers Co. corrosion laboratory at Pittsburgh. He is fairly surrounded with corrosion on the cover — just as he and his fellow corrosion engineers are in their daily battle against this foe.

See Dr. Fair's comprehensive article, "Corrosion — Training and Trends," which sets the stage for this month's Corrosion Control feature starting on page 38.



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over the editor's shoulder

Men Who Help Us Battle Corrosion

Putting together this feature on corrosion control has been a rewarding experience. We counted on the expert assistance of many of the top corrosion authorities in the country . . . and received their whole-hearted support.

Dr. Fair ("Corrosion Training and Trends"—page 38) took hold of the article idea that we mutually conceived a few months ago in our Chicago offices, and came up with what we think is an excellent thought-provoking piece.

Don Macleary, Du Pont metallurgical engineer, supplied the essential data for the titanium Corrosion Keys (page 67). Our hearing of his discussion on the metal at an International Nickel Sea Horse Institute meeting at Kure Beach sparked the idea. Don stopped by our Chicago headquarters later to check out the final plans for the presentation.

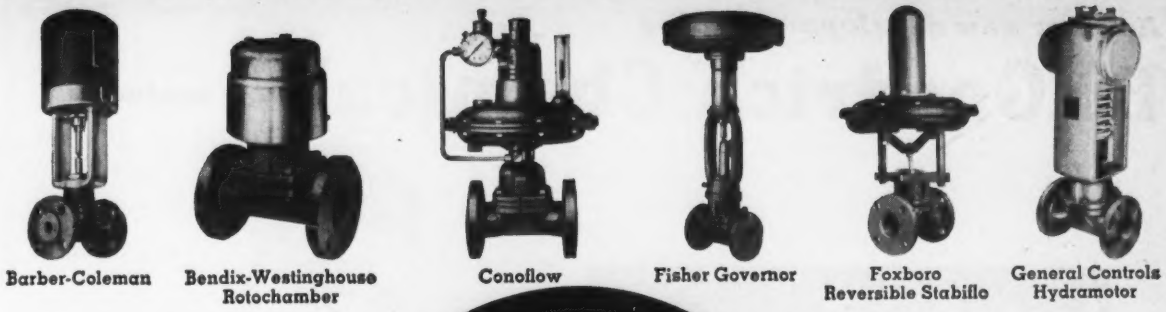
Stories on techniques used for controlling corrosion at the Westvaco Chlor-Alkali Div. of Food Machinery & Chemical Corporation (pages 44 and 45) were the direct result of the excellent cooperation of William Van Vliet Bacon, a top "corrosion fighter." Van has been a terrific help to us ever since we first met him in Westvaco's South Charleston, W. Va., plant. (Look for more corrosion-control ideas from his plant in future issues of CP.)

These are only three of the many recognized corrosion authorities who regularly lend us valuable aid. We sincerely thank all of them for the interest they have shown.

Story ideas come from many sources. The insights offered by men such as these — talking about the subject they know best, in meetings, cloakrooms, corridors, or wherever else we chance to meet — give real substance to the finished article.

Gordon Weyermuller

ASSOCIATE EDITOR

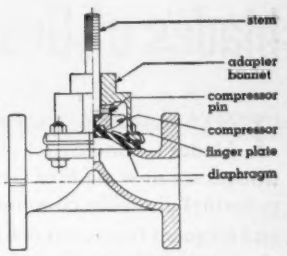


GRINNELL-SAUNDERS Diaphragm Valves are easily equipped for power operation — by combining any of numerous power operators, a sliding stem bonnet assembly, and a valve body. The sliding stem bonnet can be modified to accommodate any make of power operator, pneumatic or electric.

Grinnell-Saunders Diaphragm Valves are unsurpassed for handling materials as diversified as corrosive fluids, gases, beverages, foods . . . in lines where corrosion, abrasion, contamination, clogging, leakage and maintenance are costly factors.

The operating principal of the Grinnell-Saunders Diaphragm Valve is simple. The resilient, flexible diaphragm is lifted high when the compressor is raised and pressed tight against the body weir when the compressor is lowered.

Grinnell valves are available with body, lining, and diaphragm materials to meet different service conditions. For further information, write Grinnell Company, Inc., 236 West Exchange St., Providence, R. I.



This sliding stem bonnet is specially designed for power operation. The power operator is attached to the adapter bonnet and to the threaded end of its free-sliding stem. Thus, the operating force is applied *directly*. The stem, in turn, is directly connected to the compressor which opens and closes the valve when power is applied. This sliding stem bonnet is interchangeable with other bonnet designs.

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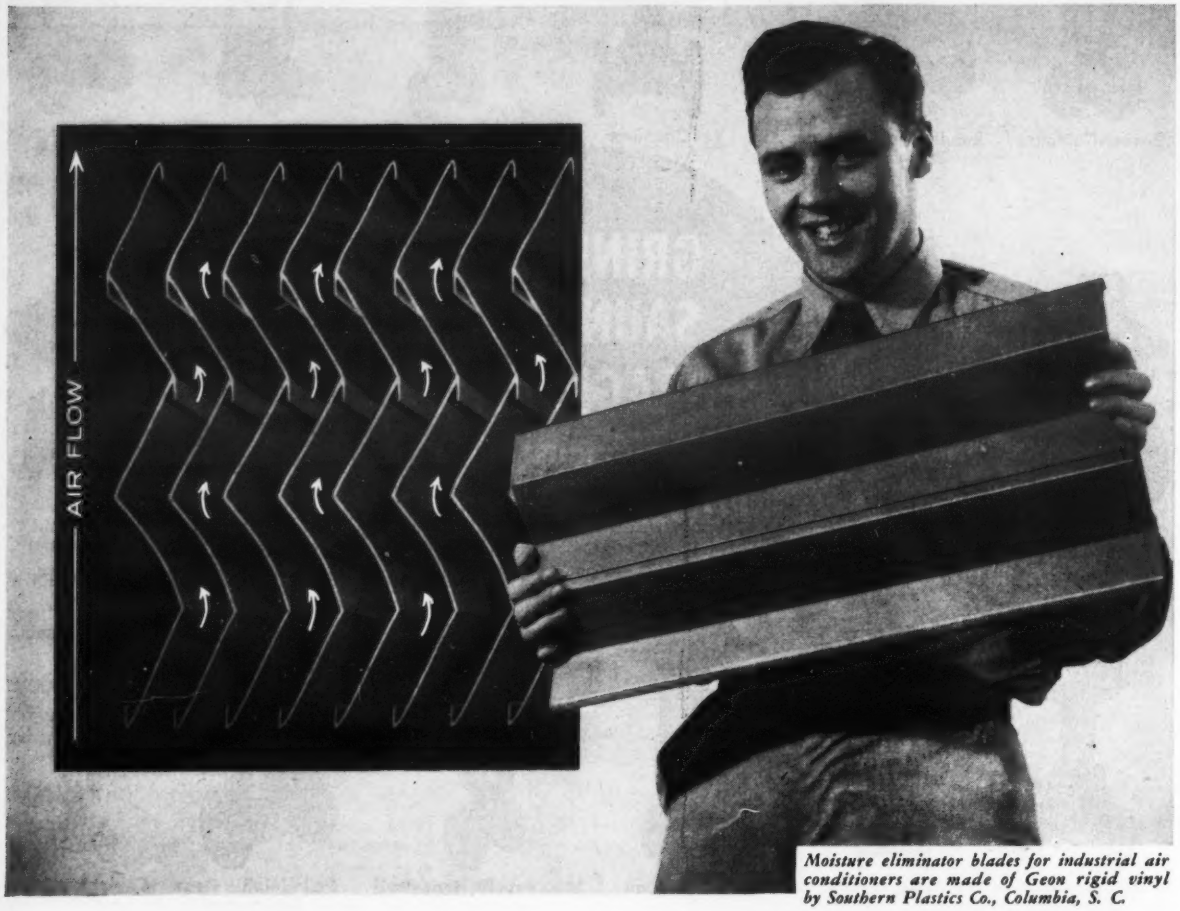

Moisture eliminator blades for industrial air conditioners are made of Geon rigid vinyl by Southern Plastics Co., Columbia, S. C.

blades of Geon keep air dry...end replacement problems

THESE moisture eliminator blades for industrial air conditioners are now made of Geon rigid polyvinyl chloride compound — to end frequent replacement of formed sheet metal blades.

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Geon polyvinyl resins and plastics are unique raw materials. Their outstanding physical, chemical and electrical properties have opened markets for many new products—rigid piping, wire insulation, flexible wall covering, foam padding, coatings for textiles, metal and paper.

For further information on Geon write Dept. FJ-4, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

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conventions and exhibits

August 20-23. Western Electric Show and Convention, Cow Palace, San Francisco.

September 8-13. American Chemical Society, national meeting, New York.

September 9-13. The Instrument Society of America, 12th Annual Instrument Automation Conference and exhibit, Auditorium, Cleveland.

September 10. Synthetic Organic Chemical Manufacturers Association, luncheon meeting, Hotel Roosevelt, New York.

September 11-13. National Petroleum Association, 55th annual meeting, Traymore Hotel, Atlantic City.

September 11-15. Twelfth Annual Instrument-Automation Conference and Exhibit, Auditorium, Cleveland.

September 15-18. American Institute of Chemical Engineers, meeting, Lord Baltimore Hotel, Baltimore.

September 16-17. Chemical Market Research Association, meeting, Lake Placid, New York.

September 30-*October* 1. Material Handling Institute, Inc., Joint-Industry Fall meeting, Greenbriar Hotel, White Sulphur Springs, West Virginia.

September 30-*October* 2. American Oil Chemists' Society, meeting, Netherland Plaza Hotel, Cincinnati.

October 6-8. Fluid Controls Institute, meeting, Westchester Country Club, Rye, New York.

October 6-10. The Electrochemical Society, Inc., meeting, Statler Hotel, Buffalo, New York.

October 7-8. 1957 National Electronics Conference. 13th Annual Forum on Electronic Research, Development, and Application, Hotel Sherman, Chicago.

October 15-18. Scientific Apparatus Makers Association, midyear meeting of Recorder-Controller Section, Seaview Country Club, Absecon, N. J.

October 17-18. National Conference on Industrial Hydraulics, sponsored by Armour Research Foundation and Illinois Institute of Technology, Hotel Sherman, Chicago.

October 21-25. National Metal Exposition, Chicago.

October 21-25. 45th National Safety Congress and Exposition, Conrad Hilton Hotel, Chicago.

October 20-23. Scientific Apparatus Makers Association, midyear meeting of Industrial Instrument Section, Grand Hotel, Point Clear, Alabama.

October 22. American Society of Safety Engineers, annual meeting, Conrad Hilton Hotel, Chicago.

October 23-24. Computer Applications Symposium, sponsored by Armour Research Foundation, Hotel Sherman, Chicago.

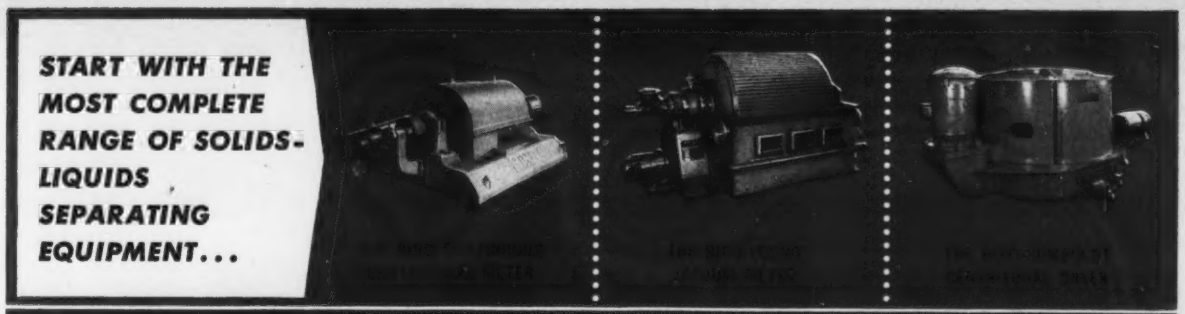
October 28-31. The National Industrial Packaging & Handling Exposition, Convention Hall, Atlantic City, New Jersey.

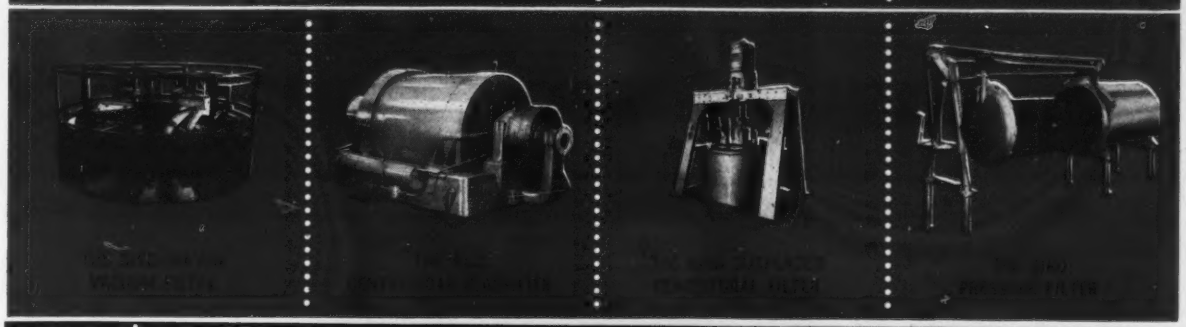
October 30-*November* 2. Federation of Paint and Varnish Production Clubs, 35th annual meeting, Bellevue Stratford Hotel, Philadelphia.

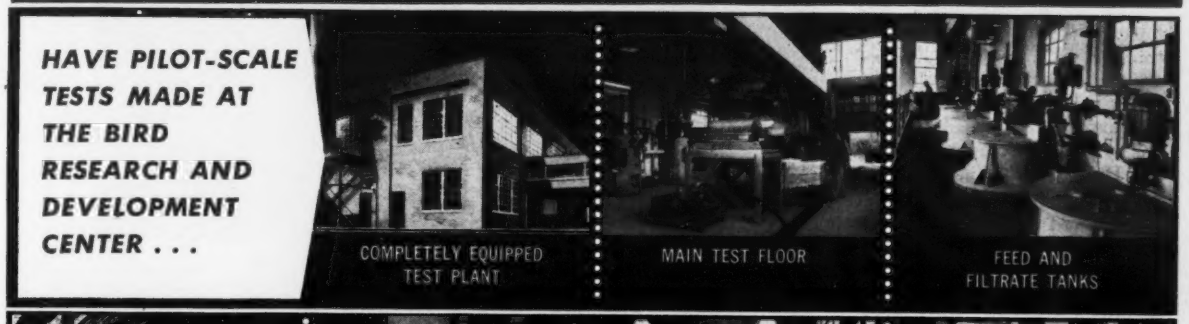
November 2-8. Second World Metallurgical Congress, sponsored by American Society for Metals, Chicago.

November 11-14. American Petroleum Institute, meeting, Conrad Hilton Hotel, Chicago.

November 12-14. National Association of Corrosion Engineers, Northeast Region, fall meeting, Penn-Sheraton Hotel, Pittsburgh.



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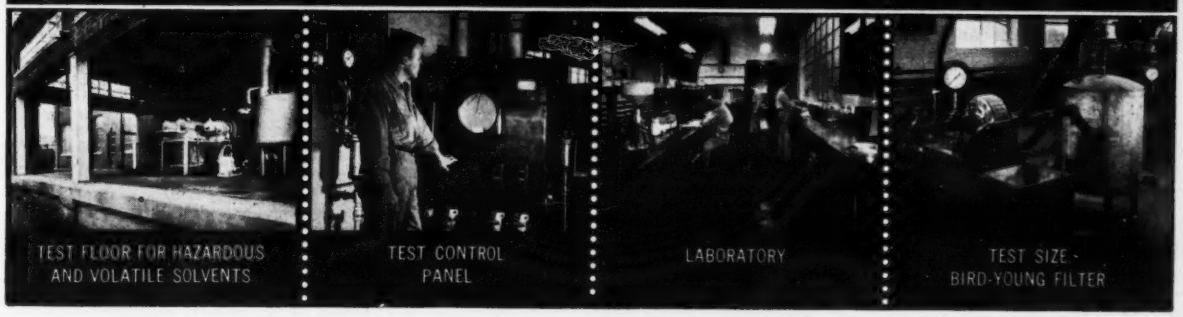

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looking ahead to next month

Engineer C. H. Vogel checks flow rate of concentrated hydrochloric acid

Batches hydrochloric to accuracy of 0.5 percent — consistently

Aluminum hydrogels are hard-to-handle materials — difficult to filter, hard to extract from reacting solutions unless pH is held to extremely narrow limits.

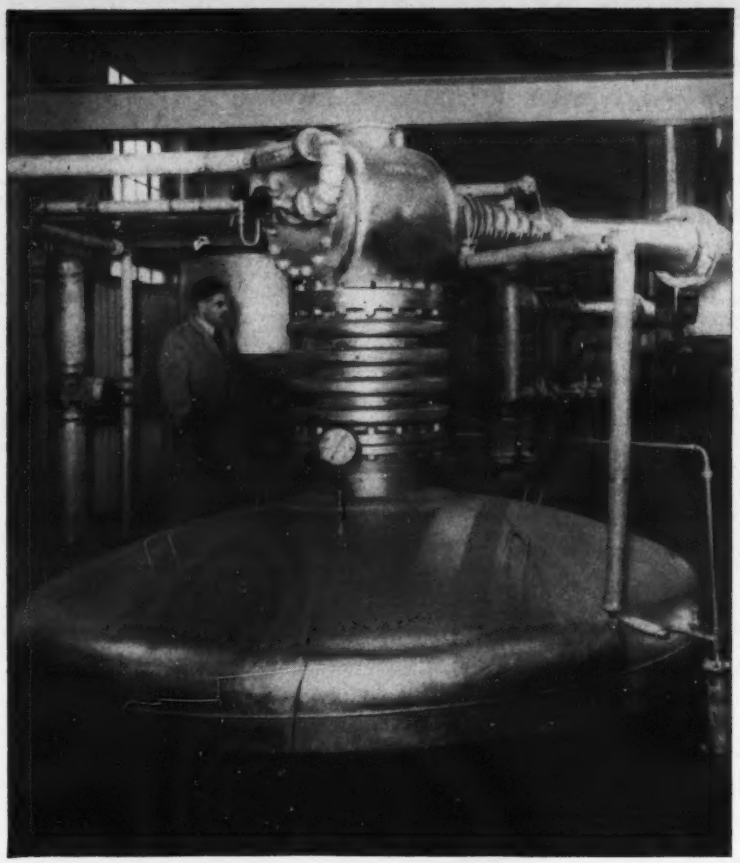
The Reheis Company, Berkley Heights, N. J., solved the problem of precise control, runs its operations with the same accuracy that is found in a lab using measurements to a fraction of a drop.

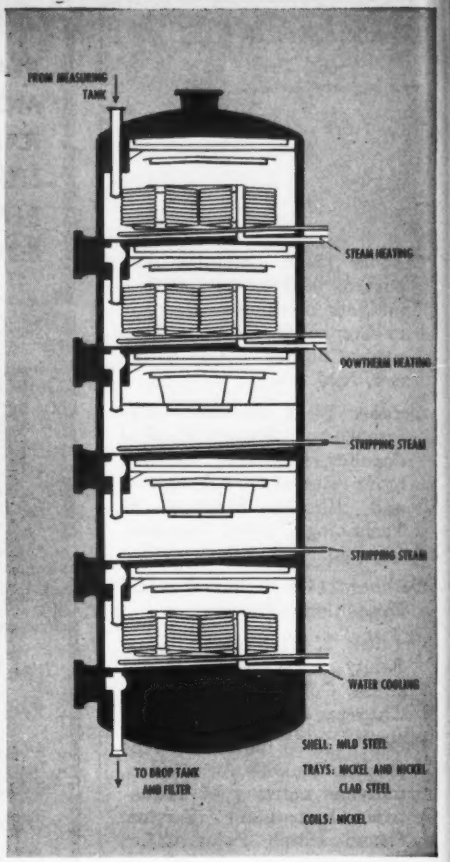
Assistant Editor Bill Clarke visited the plant and learned from Director of Engineering S. M. Beekman and Chemical Engineer C. H. Vogel how a turbine-type flow meter helps them maintain the needed accuracy. His story is in next month's Instrumentation and Control section.

Unions for engineers?

"Forming an organization to get something done," says Joseph Amann, president of the Engineers and Scientists of America, "is the story of our country's history. In order for engineers to solve the problems now facing them, to achieve proper economic and professional recognition, engineers much be unionized."

In next month's CHEMICAL PROCESSING, read what the head of the largest independent collective bargaining group for engineers has to say about this vital subject — unionization for scientific manpower.





Nickel protects purity of vegetable oils during deodorization in these Southern Oils, Ltd. stills. Diagram shows general arrangement and where nickel is used in the units. Fabricator: Rose, Downs & Thompson, Ltd., Hull, England. Design: Girdler Corporation of America.

Processed in nickel, foods and other organics stay fresh longer

One of the most baffling problems in converting and purifying vegetable oils for human consumption is presented by the equipment itself.

Even minor corrosion of this equipment may build up metallic concentrations in the product sufficient to create new threats to purity. High process temperatures amplify the danger.

The harm shows up in storage. Early rancidity. Undesirable color changes.

Processing in nickel equipment provides double protection

Nickel acts in two ways to prevent trouble of this kind.

1. Nickel resists corrosion by fatty acids and other corrosives in vegetable oils and many foods . . . even at elevated process temperatures. With nickel, metallic concentrations usually stay far *below* the harmful level.
2. Nickel doesn't promote rancidity and color changes. It's non-toxic, too.

Southern Oils, Ltd. (Manchester, England) is one of many companies that takes advantage of these properties to insure high product purity. In their vegetable oil deodorizing stills, for example, (see photo and drawing) tray sides are nickel-clad steel plate, tray base and heating coils pure nickel. So are many of the auxiliary fittings . . . tray tops, liquid level probes, etc.

Despite process temperatures that run as high as 475-480°F., Southern Oils' storage experience with the product has been excellent.

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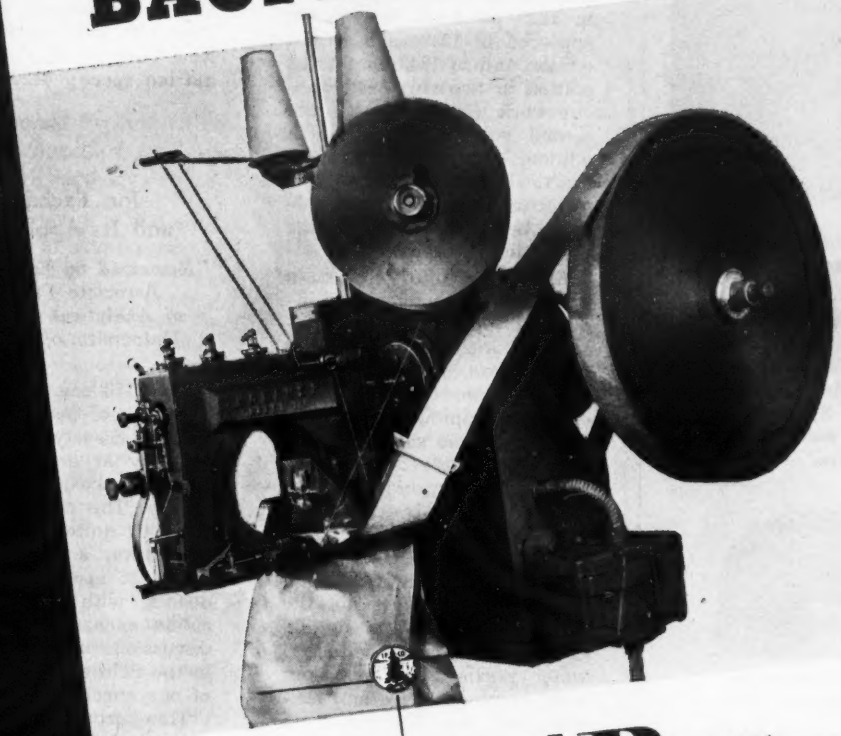

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A. E. Staley's Robert Schwandt points out highlights of new starch dryer building to Assistant Editor George Michael

specifically designed to handle the high-quality materials.

Assistant Editor George Michael visited the new Decatur, Ill., plant and talked to the engineers who planned and designed the installation. He points out the highlights of the plant in CHEMICAL PROCESSING for August.

The tariff question

Have we gone too far in cutting tariffs, threatening the very existence of vital industries in this country?

Both sides of this crucial question are explored by two leading authorities in the August issue of CP.

Dr. Lewis E. Lloyd, Economist, Head of Business Research for The Dow Chemical Company, discusses how tariffs protect chemical markets. According to Dr. Lloyd, if tariffs are removed or are set too low, business will migrate to foreign countries.

The other side of the tariff picture is covered by Sidney A. Swensrud, Chairman of the Committee for a National Trade Policy and ex-Chairman of Gulf Oil.

Mr. Swensrud points out that maintenance of export trade depends upon reasonably low tariffs.

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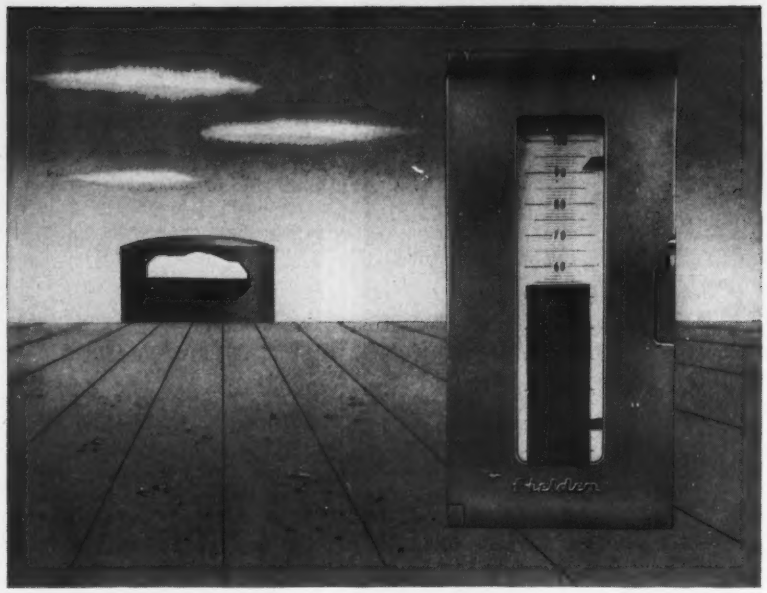

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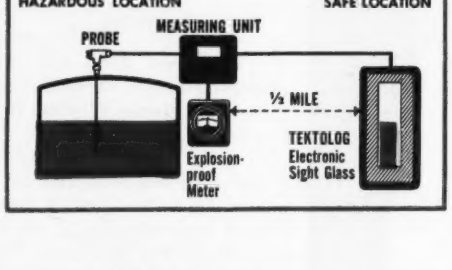

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recent books

reviews of current technical and reference work . . . summarized for you by authorities in the field with the CP staff

Hydrogen Ions

Reviewed by H. A. LAITINEN
University of Illinois

This book by Herbert T. S. Britton, originally published in 1929 as a single volume, appeared in 1932 as a second edition and in 1942 as a third edition in two volumes. Present work (508 pages) is the second volume of the fourth edition. As such, it covers practical applications of pH measurements, the first volume being devoted to the theoretical aspects.

As in the third edition, a vast array of chemical and industrial applications is described. Included are effects of hydrogen ion concentration in oxidation-reduction processes; precipitation of hydroxides, basic salts, sulfides, and phosphates; detection of metals with organic reagents; electrodeposition; leather manufacturing and tanning; sugar manufacturing; pulp and paper manufacturing; and brewing. Text points out the importance of pH in milk, eggs, and the baking industry; water purification; corrosion; soils; ceramics; dyes and textiles; and ore flotation.

A new and important topic is that of non-aqueous acid-base titrations. It is a pity that the important work of Grunwald in ethanol-water systems was not covered, and that the work of Kolthoff and Bruckenstein in glacial acetic acid came too recently to allow presentation of a better theoretical foundation for the many practical applications in this solvent. In the chapter on oxidation-reduction processes, no distinction is made between reversible and irreversible half-reactions.

This present volume, like its predecessor, should be of value to many workers in science and industry, primarily as a critical selection of applications of pH measurements to many practical problems.

To obtain "Hydrogen Ions, Vol. II" remit $12.50 direct to D. Van Nostrand Co., Inc., Dept. CP, 250 Fourth Avenue, New York 10, N. Y. When inquiring specify 4420.

Ion Exchange and Its Application

Reviewed by E. L. GROVE
Associate Professor of Analytical Chemistry
University of Alabama

This 173-page book is the collection of papers presented by the Society of Chemical Industry at a conference on ion exchange at London University. The material is general but quite comprehensive in nature, and ranges from theory to applications. Papers dealing with applications, as cation exchange in soils, are discussions of work being done in the field and not the result of one specific study.

This group of papers is divided into four general fields:

1. Three papers on theoretical aspects include a discussion of structure, synthesis, and general properties of resins; equllibrium and kinetics; and principles involved in operation of columns.

2. Industrial applications deal chiefly with methods and materials for demineralization and deionization of water, since these are probably the most important and greatest uses of ion exchange materials.

3. Section on inorganic and analytical applications consists of a group of six papers and includes an excellent summary

on analytical aspects in addition to papers on gold recovery, continuous ion exchange, resins in complex property studies, and desalting of brackish and sea water.

4. The seven papers on organic and biochemistry applications include such topics as aminoacids, peptids and proteins; therapeutic applications; cation exchange in soils; and assay of alkaloids.

To obtain "Ion Exchange and Its Applications" remit $7.50 *direct to the MacMillan Company,* 60 *Fifth Ave., New York, N. Y. Specify* 4421 *opposite last page.*

Chemical Process Economics in Practice

Reviewed by D. S. Davis
Professor of Engineering
University of Alabama

This collection of papers, edited by J. J. Hur, originated in a symposium conducted in April 1956 by the Philadelphia-Wilmington section of the American Institute of Chemical Engineers and the School of Chemical Engineering of the University of Pennsylvania. In 115 pages, eight industrialists deal authoritatively with accounting, plant investment, cost of services, plant operating costs, pricing the chemical product, economic analysis, and financing the plant.

Somehow, that brand of dull, vague exposition that seems to characterize so many books on economics hasn't been allowed to creep into this one. Illustrative examples are straightforward and easy to understand, tables are clear, and the several line cuts are well done. One of the best features is that contributed by H. R. Moody, of the Rohm & Haas Company, who presents two procedures for comparing depreciation that are not readily available elsewhere: the sum-of-digits method and the double-declining balance method. Each is compared graphically with usual straight-line method.

To obtain "Chemical Process Economics in Practice" remit $3.95 *direct to Reinhold Publishing Corp.,* 430 *Park Avenue, New York* 22, *N.Y.*

Technique of Organic Chemistry — Laboratory Engineering

In this greatly enlarged second edition edited by Arnold Weissberger, the older chapters, Mixing, Heating and Cooling, have been expanded and brought up to date. Also, a number of sections have been added to deal with new laboratory techniques. A major change from the previous edition is that methods of Separation and Purification have been collected in a special Part 1 and published separately. New chapters have been added to this second part which deal with Choice of Materials for Equipment, with Diminution and Classifying, and with Operations with Gases. The 391-page text is divided into five sections, each of which is indexed and complete with references.

To obtain "Part II: Laboratory Engineering, Technique of Organic Chemistry Series" remit $8.00 *direct to Interscience Publishers, Inc., Dept. CP,* 250 *Fifth Ave., New York* 1, *N. Y. When inquiring specify* 4421A *on form opposite last page.*

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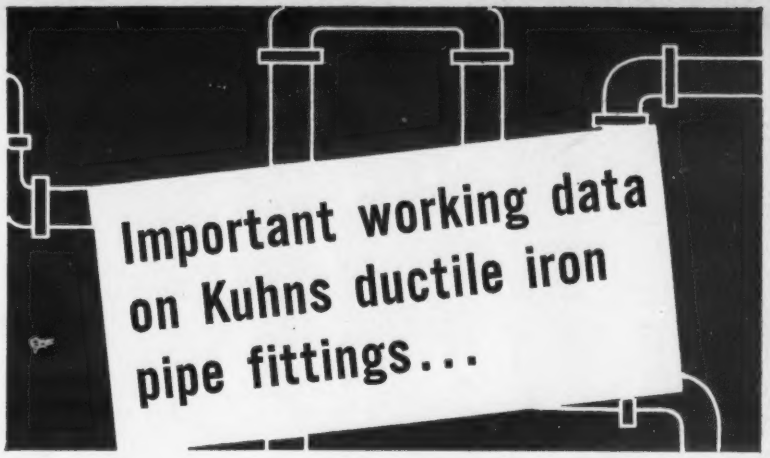

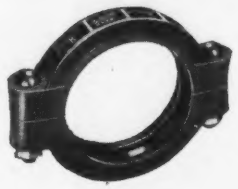

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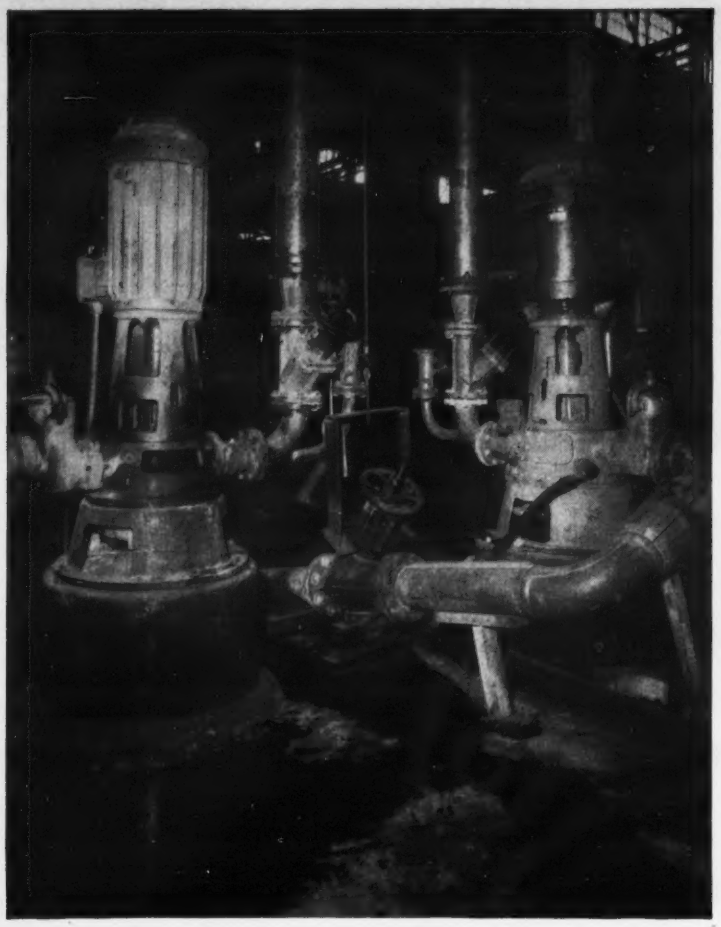

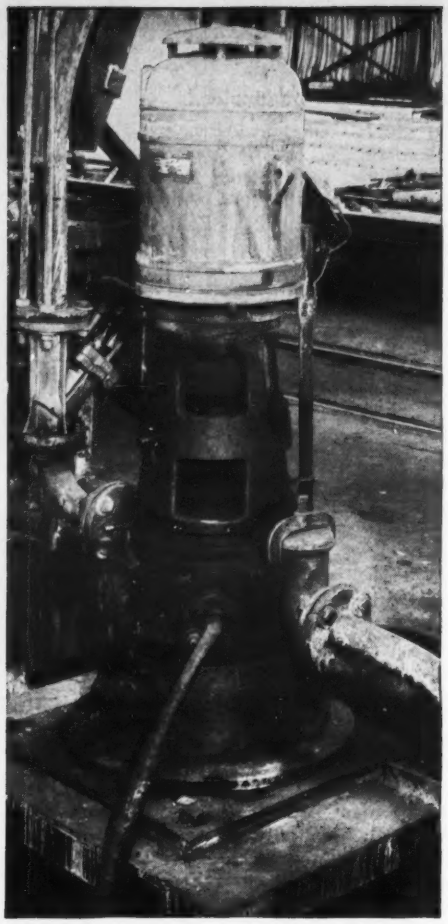

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Book is in seven sections: the elements, inorganics, organics, analytical chemistry, physical chemistry, industrial chemistry, mathematical tables, and the index.

To obtain "Handbook of Chemistry, Ninth Edition" remit $8.50 direct to Handbook Publishers, Inc., Dept. CP, Sandusky, Ohio. When inquiring check 4423A opp. last page.

Molecules and Crystals in Inorganic Chemistry

Reviewed by
DAVID P. SHOEMAKER
Associate Professor of Chemistry
Massachusetts Institute of Technology

In this second English edition, as in the first, A. E. van Arkel treats inorganic molecules and crystals in a simple but largely quantitative way, almost entirely from the standpoint of the ionic bond. Ionization potentials and electron affinities, interionic potential energies, polarizabilities, and dipole moments are applied to the discussion of such topics as valence, stability of compounds, acids and bases, complexes, oxidation and reduction, and the hydration and solvent properties of water. Non-ionic bonds, namely van der Waals-London forces, covalent bonds, and metallic bonds, are discussed in a final chapter which serves to ameliorate somewhat the possibly over-

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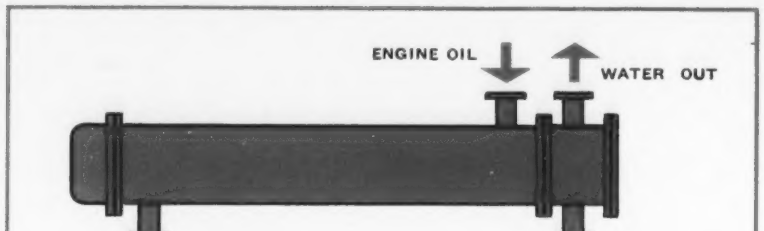

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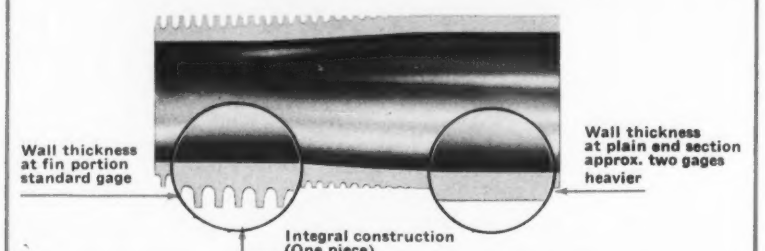
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Trufin-Tubed Engine Oil Cooler Provides Maximum Performance—Minimum Upkeep

BY ERNEST DODD

Most of the time, cooling engine oil is the kind of job refinery men would just as soon do without. In most cases it's a dirty service — requires frequent cleaning of tube bundles and, because it is primarily a maintenance cost item — it doesn't produce a profit.

But like it or not—it has to be done —and here are the details of how engineers in a Texas refinery have removed much of the difficulty usually encountered in this type of work.

Four years ago, this firm put in service a heat exchanger tubed with 172 eight-foot lengths of Wolverine Trufin®—Type S/T—the integrally finned condenser tube. This exchanger operates next to identical units tubed with prime surface tube.

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TYPE S/T HAS 150% THE SURFACE OF PLAIN TUBE

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strong prejudice for the ionic viewpoint. The new edition contains some new or expanded material on stability of ionic compounds, compounds of variable composition, complexes, non-ionic complexes, and interstitial compounds.

This 270-page book is claimed to be intended for first-year college students, but such use would be very difficult in this country. It might well be used in a course in structural chemistry or a second course in inorganic chemistry, although it presents little descriptive material of a structural nature. There are no references to periodical literature or to other books.

Work may be recommended as an illuminating exposition of the ionic viewpoint.

To obtain "Molecules and Crystals in Inorganic Chemistry" remit $4.75 direct to Interscience Publishers, Inc., 250 Fifth Ave., N.Y. 1, N.Y. Check 4423B opp. last page.

Encyclopedia of Chemical Technology

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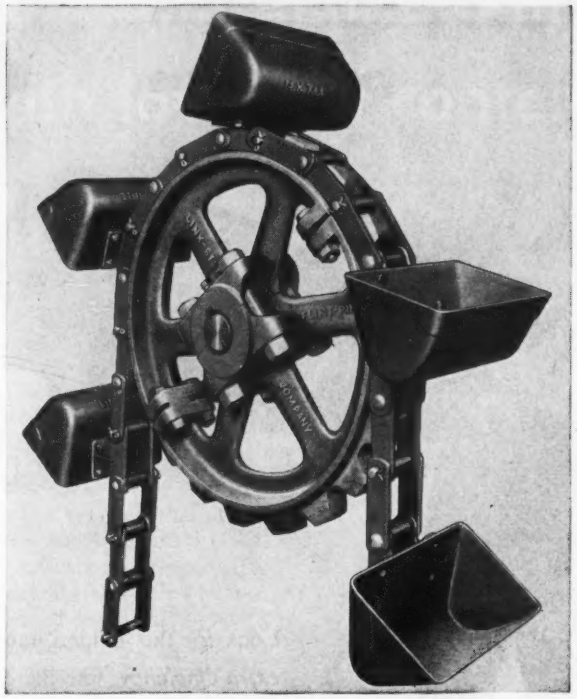
Link-Belt SS Class bushed chain outlives previous chain 4 times



LONG, TROUBLE-FREE SERVICE of SS-111 chain (above) proves that it pays to select the right chain for a specific job from Link-Belt's complete line. It also proves that there's no need to pay a premium for costly special alloy steel chains.

Outstanding record established in severe, abrasive elevator service

This remarkable service record set by a Link-Belt SS-111 bushed chain (left) proves that often there's no need to go to excessively costly special alloy cast chains to get long life. Used at an Indianapolis (Ind.) fertilizer plant, this chain handled an average of 75,000 to 80,000 tons of fertilizer before requiring replacement. The previous type of chain handled only 18,000 tons and required four times as much maintenance.

Designed for abrasive jobs

Link-Belt SS-111 bushed chain offers large joint bearing surfaces for greater wear resistance and trouble-free service in heavy-duty conveying and elevating. Sidebars of selected bar steel are accurately formed and machined for tight press fit of pins and bushings. The latter are made from tough, hardened steel and locked against rotation in sidebars.

These straight steel sidebars with hardened steel pins and bushings provide needed strength to prevent distortion under continuous heavy loads. Smooth, tough surfaces repel gritty materials, prevent packing in critical joints, resist abrasion and corrosion.

Many sizes of these heavy-duty chains are interchangeable with Link-Belt combination chains. And a wide range of attachments makes them adaptable to specific conveying and elevating requirements.

18 million tons, 26 years later... SS-856 chain still serviceable

Sets record in cement mill elevator service

The more than quarter-century of continuous handling of raw materials at a Pennsylvania cement mill illustrates the long-wearing durability of Link-Belt SS-856 elevator chain. This amazing service record under extremely tough conditions proves that it pays to pick the right chain from Link-Belt's complete line.

Link-Belt SS-856 chain is made of high carbon steel sidebars with nickel alloy pins and bushings. Hardened sidebars give additional strength plus greater resistance to wear and pitch hole distortion. In addition, accurately machined pitch holes assure proper pitch and tight press fit of mating parts —extend chain life. The hard, smooth surfaces of steel joints repel gritty materials . . . resist abrasion.

Link-Belt elevator chains are available with ultimate strengths up to 200,000 lbs.

Link-Belt SS-102½ bushed chain extends life of stone elevator

Several years ago an eastern stone quarry installed a main bucket elevator to handle 200 tons per hour of minus 2¼-in. mixed stone. Service life of the original two-strand elevator chain was found inadequate. After several shutdowns, it was replaced with Link-Belt SS-102½ chain with K-5 attachments at every third link.

This long-life, wear-resistant chain is now in its fourth year of uninterrupted operation. It has carried over 475,000 tons as compared to 60,000 tons which was considered normal life for the previous chain.

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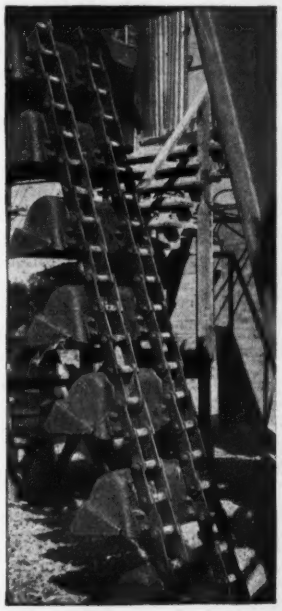

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Professor of Engineering
University of Alabama

Every once in a while some publisher, thoughtfully but with a measure of courage, comes up with a book designed to give authoritative answers to questions in a growing field of technology and planned to entice the reader into delving deeper into the subject than he had ever intended. That's what Reinhold, aided and abetted in general by the Society of Plastics Engineers, has accomplished in this volume, "Quality Control for Plastics Engineers."

Lawrence M. Debing and ten capable assistants who know how to write, discuss, with clarity, normal frequency distributions, control charts for variables and attributes, specifications for use under statistical quality control, inspection by sampling, statistical correlation, analysis of capability of a process, significance of data, and statistical experiments. Although applications are to the production of plastic parts, no knowledge of the technology of plastics is necessary for a grasp of the subject. Treatment is broad, informative, and with a delightful beckoning quality that a serious reader can scarcely resist. Style is clear, direct, and definitely lively.

The excellent chapter on significance, by Gilbert L. Peakes, contains well-chosen illustrative matter, and is itself highly significant of the aims and achievements of the project. In 142 pages, fortified with 48 figures and supplemented with tables for the distribution of *F*, for chi-square, and for the "t" test, the editor and co-authors have made a real contribution to the literature of quality control.

To obtain "Quality Control for Plastics Engineers" remit $4.95 *direct to Reinhold Publishing Corp., 430 Park Ave., New York 22, N.Y.*

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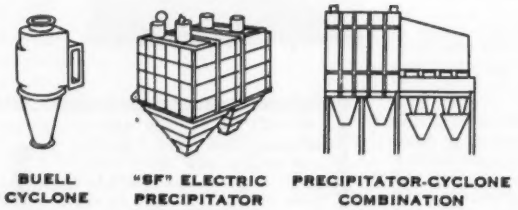

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Another new castable with over two years of field service, B&W Kaolite-LI has high insulating properties due to its light weight (only 59 pounds per cubic foot). Its iron content is also less than 1%. It is designed to be applied with a cement gun only. Installation and maintenance time can be cut since Kaolite-LI does not require water curing and heat can be applied directly after gunning.

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Use limit, °F		3000	2700	2300	3200
Melting point, °F		3200	3100	2700	3297
Average density lb/cu ft after firing		126	131	59	134
Average % Fe_2O_3		1.0	0.9	0.8	1.0
Cold crushing strength—psi average—after heating for 5 hrs. at:	1000 F	700	2500	350	1000
	1500 F	500	2500	350	800
	2000 F	400	1200	300	750
	2200 F	500	1300	450	1000
	2400 F	500	1600	—	2000
	2600 F	1000	6000	—	3000
	2800 F	2200	—	—	3500
	3000 F	3500	—	—	4000
	3200 F	—	—	—	5000
Permanent linear shrinkage—average % less than—after heating for 5 hrs. at:	1000 F	0.3	0.2	0.3	0.2
	1500 F	0.3	0.2	0.4	0.2
	2000 F	0.5	0.2	0.4	0.2
	2200 F	0.5	0.2	0.6	0.4
	2400 F	0.5	+0.1	—	0.5
	2600 F	0.5	—	—	0.5
	2800 F	0.5	—	—	0.5
	3000 F	0.3	—	—	0.2
	3200 F	—	—	—	0.1

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nuclear notes

AEC gives "go-ahead" on experimental facility

Atomic Energy Commission has issued permit for construction of nuclear experiment facility at Middle River, Md., to Glenn L. Martin Company, Baltimore Md.

Facility will be housed in building located within boundaries of Martin Airport.

Two critical experiment cells will operate independently of each other in the facility. Initial experiments will relate to Martin Power Reactor and to systems similar to US Army Package Power Reactor.

Fort Belvoir Labs grow 32-lb crystal

Chemists at the Army Engineers' Research and Development Laboratories, Fort Belvoir, Va., have grown a 32-lb thallium chloride crystal for AEC-supported nuclear physics research at the Synchrotron Laboratory of California Institute of Technology. The crystal will provide means of measuring high energy electrons, X-rays, mesons, and other atomic components produced by the Synchrotron. Crystal is 7" long, has 6" diam.

Joint conference planned on reactor safety

The AEC, the Atomic Industrial Forum, and the American Nuclear Society, will sponsor a technical conference on reactor safety on October 31, 1957, in New York City. The one-day unclassified conference — open to all who wish to attend — is designed to acquaint the private atomic energy industry with information on safe operation of nuclear reactors. Additional information can be obtained from the Atomic Industrial Forum, Dept. CP, 3 E. 54th St., New York 22, N. Y.

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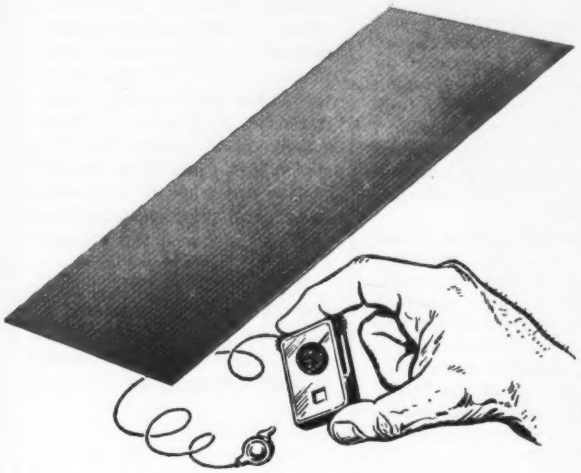
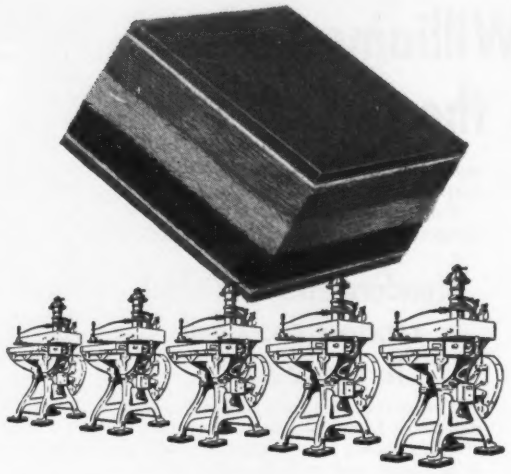


. . . or Vibra-Mount felts to cut machine vibration*



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Radiation exposures must be reported

Regulation on standards for protection of workers and the public against radiation has been amended by Atomic Energy Commission. Regulation now provides that all licensees promptly notify the Commission of potentially serious accidents involving licensed material.

In addition, each licensee is required to make detailed report in writing within 30 days, of all incidents resulting in radiation exposures or concentrations of radioactive materials above permissible limits, regardless of extent.

Vital test information released to industry

Results of 15 years research on nondestructive test methods were recently released to industry by the AEC at a meeting in Chicago sponsored by five scientific groups. The tests are primarily designed to detect material defects and should be of benefit to manufacturers of many consumer items.

The 40 technical papers will be published for the sponsoring groups in fall of 1957 in book form. To order book remit $10 direct to the American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa. . . . or for more information check 4430 opp. last page.

More patents released by AEC

Descriptions of 35 more patents owned by the Government and held by the AEC have been released. This brings the total number released for licensing up to 1128. The Commission grants nonexclusive, royalty-free licenses on the patents, as part of its program to make nonsecret technological information available to industry.

Turn to next page

Corrosioneering News

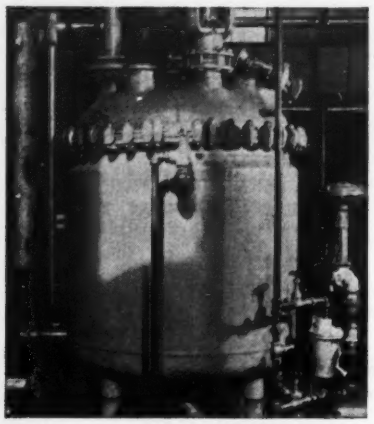
Quick facts about the services and equipment available to help you reduce corrosion and processing costs.

Published by The Pfaudler Co., Rochester, N.Y., U.S.A.

How Sherwin-Williams makes 1 reactor live the life of 12

To make the dye "Alkali Blue," the Sherwin-Williams Company has to handle hot, corrosive acids and harsh, abrasive precipitates.

These materials quickly eat their way through ordinary reactors—one through corrosion, one through erosion.



Sherwin-Williams used to employ cast iron kettles which lasted from six to eight months.

Then, eight years ago, they installed three Pfaudler glassed steel reactors. Those reactors are still giving full-time duty.

The original three Pfaudler reactors have already lived the life of 36 of the ordinary cast iron reactors —*and they're still in service.*

Glassed steel now standard

Their success with the reactors soon led Sherwin-Williams to specify Pfaudler glassed steel whenever they process flammable, volatile, corrosive chemicals.

For example, intermediates for cresol are made in three 200-gallon Pfaudler reactors and an eight-section cooler. 98% concentrated sulfuric acid and toluene course through this equipment day after day without a trace of corrosion or product contamination (glass has no catalytic or direct reaction with most chemicals).

Then, a 10,000-gallon Pfaudler glassed steel storage tank collects waste sulfuric acid at 50% concentration for reclamation.

For more information, check the coupon for a copy of Bulletin 936.

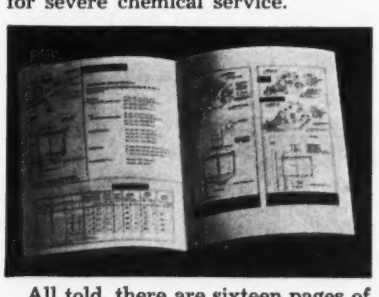
Standard stainless steel reactors described in new bulletin

We've prepared a new bulletin which discusses how you can use standard stainless steel reactors in the lab, in pilot plant, and in full-scale production.

The bulletin covers sizes ranging from 5 to 2000 gallons.

Detailed diagrams and specifications of designs cover heavy-duty drives, engineered agitation systems, rotary seals and stuffing boxes, baffles, thermometer wells, and dip pipes in a range of sizes to match each vessel.

Of the numerous types of stainless steel available, Pfaudler has standardized on Types 304, 316, 321, and 347 as offering the best all-around corrosion resistance for general process equipment. The extra low carbon grades plus full annealing of all grades, are also available, broadening the range of Pfaudler reactors for severe chemical service.



All told, there are sixteen pages of useful information in this Bulletin Number 944. If you work with reactors, it should prove an indispensable part of your file. Check the coupon for a copy.

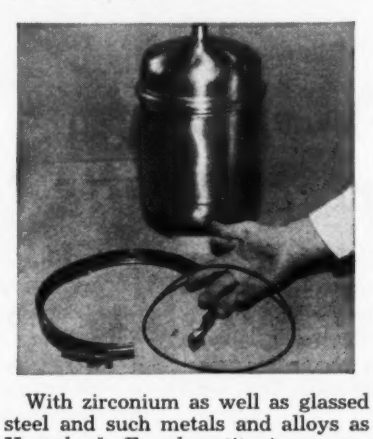
Pfaudler metals now run from "A"* to Zirconium

We feel that glassed steel is usually your most economical choice for corrosive service. There are applications, however, where glassed steel is not your best buy—so we maintain an arsenal of metals and alloys which you can also use where you encounter specific types of corrosion.

The latest addition to this arsenal is zirconium—a metal which has outstanding resistance to selected corrosive environments.

We've been working with zirconium for some time now, studying its virtues and its idiosyncrasies. From these studies we've acquired the experience needed to design and fabricate equipment of zirconium.

You may have seen an example of our fabrication ability at the International Atomic Exhibition where we displayed a two-gallon kettle made entirely of this metal.



With zirconium as well as glassed steel and such metals and alloys as Herculoy*, Everdur, titanium, copper, nickel, Inconel, clad materials, and stainless steel, Pfaudler offers you an impartial selection of the best material for use in your processing.

*Herculoy—a silicon-bronze alloy "A."

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NUCLEAR NOTES

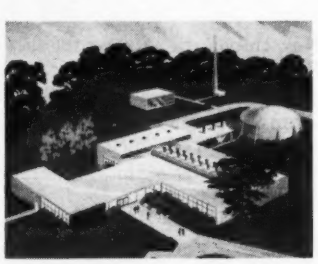
Sodium-cooled reactor goes critical

Self-sustaining nuclear fission has been achieved in the Sodium Reactor Experiment (SRE), a small-scale experimental civilian atomic power project being developed for the AEC by Atomics International, a division of North American Aviation, Inc. The SRE uses neutrons moderated with graphite to sustain the fission process, and liquid sodium is circulated through the core to remove heat.

During the initial start-up test the reactor operated at a power level of about one kw of heat. Design capacity is 20,000 kw.

Case selects site for nuclear center

Case Institute of Technology has selected a 275-acre site in Glenwillow Village of Cuyahoga County, 15 miles Southeast of Cleveland, for



Proposed Case industrial nuclear research center

its proposed $7 million nuclear center. Designed primarily for advanced industrial research and testing, a high flux engineering test reactor will be the heart of the facility.

New type atom smasher seeks heavy elements

Scientists at University of California Radiation Laboratory, are using new type atom-smasher to synthesize elements heavier than Mendelevium (element 101), the heav-

iest now known. The machine, called the "Hilac", is a linear accelerator designed for study of elements and isotopes in transuranic region. It is now accelerating nuclei of nitrogen atoms (Nitrogen 14) to energies of 140 million electron volts.

Although it does not compete in energy with such ultra-powerful machines as the Bevatron, the new atom-smasher will permit a different type of exploration of nuclear forces.

Predicts Japan will run on atom by year 2000

Nuclear energy will supply most of power requirements in Japan by the end of this century, according to **Charles H. Weaver,** vice president in charge of atomic power activities for Westinghouse.

Speaking in Tokyo, Japan, at the Conference on Peaceful Uses of Atomic Energy, Weaver said that the need for atomic power is a thing of the present in Japan.

Mr. Weaver also said that the general atmosphere in which industrial work is carried on is ideal for the rapid development of atomic energy.

No present danger from fall-out

There is danger from repeated exposure to nuclear radiation, but the damage to any one person from the fall-out of our atomic tests is negligible, so says **Dr. Richard G. Bauman,** chairman of the nuclear developments group, B. F. Goodrich Company.

The real danger is genetic, he declared, in a recent talk in Cleveland. Radiations passing through the reproductive cells can give rise to mutations in coming generations.

Our present exposure to fall-out is much smaller than that received from cosmic rays or medical X-rays, according to Dr. Bauman.

Turn to next page

little valves cast big shadows

Among Hoke's achievements with small fluid control products is the standard A431 Packless Valve pictured. We hadn't designed it as such, but this valve is one of our contributions in the field of atomic energy. Radiation Counter Labs utilizes this Hoke valve to introduce radioactive samples into their 4 pi Flow Counter. A little radiation goes a long way, and it takes a pretty hot instrument to count the number of atoms disintegrating per second in a sample. Needless to say, leakage would be inexcusable — what with scattering, self-absorption, secondary radiation, inverted gamma rays and other scandalous goings-on making it rough for the atomic scientist. To prevent such problems, this valve is helium leak tested at the brass bellows seal and air tested at the seat (These are routine tests performed on valves in standard production). Helium seat tests are performed when high-pressure is a factor.

There are many other manufacturers like RCL who consider Hoke valves with the same sense of reliability. Sometimes pressure is the important factor . . . or precise control of flow . . . or even simply attractiveness of design. But whatever the application, producers of quality test and production equipment are cognizant of the craftsmanship in Hoke products; and the users of such equipment often look for Hoke valves as assurance of equipment dependability.

Little valves do cast big shadows!

HOKE, INCORPORATED, FLUID CONTROL SPECIALISTS, 145 S. DEAN ST., ENGLEWOOD, N. J.

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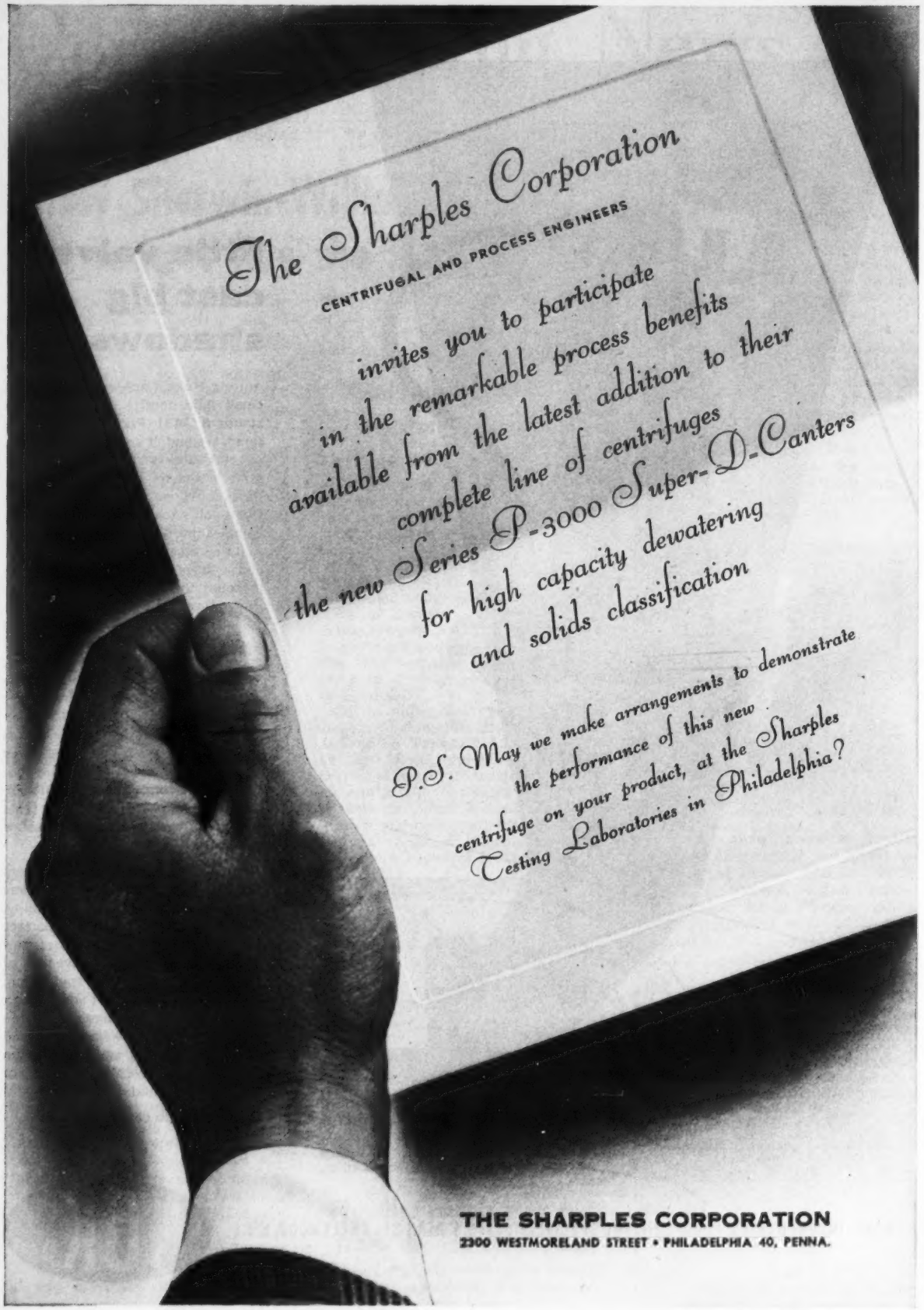
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NUCLEAR NOTES

Atomic by-products cost cut

Atomic by-products will soon be available in large quantities and at low prices to US industries. **George Boyd,** assistant director of Oak Ridge, says that within the next three months the lab will begin processing the nuclear by-products in unprecedentedly large quantities. Price may be down to $1 per curie by December. Same amount used to cost $15.

Nuclear services offered by Atlantic Research

Atlantic Research Corporation has announced its entry into the nuclear engineering field. **Dr. Michael Markels, Jr.,** formerly Manager, Heat Transfer Operations of Columbia University Heat Transfer Research Facility, will head the activities. Initial program will consist of consulting and project services.

Atomic power plant for Belgium

Westinghouse Electric International Company, New York, has signed a contract with Societe Cooperative Electro Nucleaire, Brussels, Belgium, covering an 11,500-kw atomic power plant. The plant will provide Belgium with electrical energy by the end of 1959.

Simultaneous operation of three reactors

For the first time in nuclear history, three reactors situated side by side, have been in simultaneous operation. The event took place at the Aerojet-General Nucleonics plant, San Ramon, California. Company's AGN 201 "mass produced" reactors are now being turned out at rate of two per month.

A number of interesting points were brought out in Crawford Greenewalt's talk before The Economic Club of New York on April 29. We thought you'd like to listen in on the highlights from that talk—
THE EDITORS

Progressive Taxation Kills Incentive

CRAWFORD H. GREENEWALT,
President
E. I. du Pont de Nemours & Co., Inc.

CRAWFORD H. GREENEWALT, president of DuPont since 1948, speaks with the experience of a man who leads a company that emphasizes and thrives on research. Last year, his corporation spent $77 million on research — over 4% of their sales — and twice this amount on plants to bring into commercial realization many of the fruits of this research. Mr. Greenewalt speaks on a subject of utmost importance to him, his company, and the chemical industry when he tells us what might result if corporate taxes were increased unwisely.

I suppose that if I were to briefly state the principle to which our society has been dedicated, I would say it is that we have encouraged the maximum in personal achievement by every citizen, regardless of race, creed, or national origin. We have demonstrated that the greatest good comes to the greatest numbers of people when the energies and the imaginations of men are freed of artificial and unnatural restraints. We have achieved because each man has had the encouragement to give his best effort.

Most of the bright periods of history have been short-lived. Many have ended in turmoil and retrogression. They have come to a close when the opportunities for personal achievement — limited as that may have been to an elite few — were swept away.

In our own case, we are confident we have done better. And if there is anything that disturbs me, it is the fear that we seem to be forsaking the principle which *brought* us to greatness: The simple principle of encouraging men to give their best effort.

What an astonishing paradox we present: We set high standards of achievement, yet, when the rewards of achievement are won, we reclaim most of them in the guise of taxation so that achievement not only becomes financially unattractive but an actual burden. We admire success, but penalize the successful. We admire talent, but penalize the talented. We admire initiative, yet penalize the initiator. We admire philanthropy, yet penalize the philanthropist. We admire leadership, yet we penalize and harass our leaders.

For a dozen years or so, we have rationalized the strange thesis that minority rights applicable to the talented and the successful could safely be cancelled. I am afraid that too little thought has been given to the moral implications of taxing away 90% of one man's earnings so that another's tax might seem less unpalatable. I am afraid the issue has been drawn too often along political rather than moral lines.

The talented and successful people are a minority group with few champions and little prospect for improvement. The result is that the evil of confiscatory taxes has — like vice — been first endured and ultimately embraced regardless of the wrong it imposes and the threat it poses to the future.

I'm not quarreling with the government in performing its appointed tasks. But I do take issue, not for the present but for the future, with those patterns of thought which seem determined to abandon the very drive which has placed us on the road to great accomplishment.

Now we have come to a point where it is proposed that this same principle of

Turn to page 32

The Kefauver-Patman Amendment: Millstone For Chemical Competition? The authors of the proposed

Last month's issue of Chemical Processing contained an article (page 10) entitled "The Kefauver-Patman Amendment: Millstone for Chemical Competition," written by Claude E. Hobbs, Counsel for the Manufacturing Chemists' Association. In summing up the MCA's opposition to the proposed legislation, (the so-called "good faith" amendment) Hobbs strongly expressed concern that the bill, should it become law, would seriously hamper normal competitive practices within the chemical industry.

Crux of the MCA's position: Passage of the bill would prevent a company

VICTOR R. HANSEN was admitted to the California Bar in 1928, and to practice before Federal courts in 1929. From 1931 to 1951 he was a partner in the law firm of Hansen & Sweeney, and was appointed a judge of the Superior Court in 1951.

President Eisenhower appointed him Assistant Attorney General of the United States, in charge of the Antitrust Division, Department of Justice, in July 1956.

He has been a Brigadier General in the California National Guard since 1944 and Regent of the University of California since 1946.

Probably the most cited case regarding the Robinson-Patman Act involved Standard Oil of Indiana. Its outcome was this: The US Supreme Court held that proof which showed that a price cut to a specific customer was made in "good faith" to meet the lower price of a competitor was an absolute defense against discriminatory pricing action.

The Kefauver-Patman Act would, in effect, reverse this decision and place in legal jeopardy any seller who cuts his prices under such circumstances.

Here, Assistant Attorney General Hansen, in a transcript of his statements before the Subcommittee on Antitrust and Monopoly of the Senate Judiciary Committee, clears up some points of the Standard Oil case and explains the Justice Department's opposition to the proposed legislation.

Kefauver-Patman and the Standard Oil Case

VICTOR R. HANSEN
Assistant Attorney General of the United States

My purpose here is to present Justice Department's views on S. 11, the Kefauver-Patman Bill. That Bill would amend the Robinson-Patman Act to provide that a businessman may in "good faith" meet the equally low price of his competitor unless — and this qualifying clause is crucial — "the effect . . . may be substantially to lessen competition or tend to create a monopoly in any line of commerce in any section of the country." By so qualifying Robinson-Patman's "good faith" defense, the Bill would modify a decision of the US Supreme Court which held that proof of "good faith" in such an action is an *absolute defense.*

The Justice Department opposes this modification.

To explain why, I'll first clarify the position of the Supreme Court regarding the Standard of Indiana case. Second, I'll explain why this holding best promotes antitrust's traditional goal of free competition. And, third, I'll attempt to dispel certain misapprehensions that exist about that case and its effects.

Standard Oil and the "good faith" clause

First, what did the Supreme Court hold concerning Standard of Indiana? The Supreme Court construed the "meeting competition" proviso as affording an "absolute" defense. In the Court's view, Congress had in 1936 contracted the scope of the original proviso by confining it to "price differentials occurring in actual competition," and by excluding "reductions which undercut the 'lower price' of a competitor." But these revisions had not "cut into the actual core of the defense." "Actual competition, at least in this elemental form, [was] thus preserved."

From this it seems clear that the Court did no more than to hold that a seller can reduce his price in good faith to meet a lower price in an individual competitive contest. As the Court put it, "the 'good faith' clause does not concern itself with

Turn to page 231

legislation and an Assistant Attorney General discuss this important question

from meeting its competitor's lower price without lowering its prices to *all* of the buyer's competitors, too.

In order to present all sides of this important question to the readers of CHEMICAL PROCESSING, we asked both Senator Kefauver and Representative Patman, as well as the US Department of Justice (who opposes the bill), to present their viewpoints on the subject. Here are the statements of both Kefauver and Patman, and that of Victor R. Hansen, Assistant Attorney General in Charge of the Antitrust Division, US Department of Justice.

The Problem of Price Discrimination

ESTES KEFAUVER
United States Senator

The problem of price discrimination is not new. In economic theory and in observed business conduct, price discrimination is evidence of the existence and exercise of some degree of monopoly power. Prohibition of price discrimination in rate making was one of the necessary basic provisions of the first railroad regulatory statutes in 1887. Price discrimination was also a favorite weapon of the early trusts at which the Sherman Antitrust Act of 1890 was directed. The Sherman Act only became operative, however, when monopoly had been attained, and for that reason in 1914 Congress passed the Clayton Act, in Section 2 of which it was sought to outlaw price discrimination before its anticompetitive effects were so serious as to bring the practice within the Sherman Act.

Section 2 of the Clayton Act prohibited discriminations in price in interstate sales of like goods where the probable effect in any line of commerce was (1) substantially to lessen competition, or (2) to tend to create a monopoly. The same section, however, provided that certain price discriminations were not prohibited and among them were those made in "good faith" to meet competition and those on account of difference in quantity.

Efforts of the Federal Trade Commission to enforce Section 2 of the Clayton Act turned out to be almost wholly ineffectual. One difficulty was that price discriminations which hurt only one or a few competing purchasers were held not to threaten substantial lessening of competition. A second was that any difference in quantity was held to justify any difference in price even though there was no corresponding difference in the seller's costs. Finally, and of paramount importance, meeting of competition in "good faith" was so broadly interpreted as to be readily demonstrable, with the result that the exemption it provided was virtually as broad as the prohibition.

With an anti-price discrimination statute full of loopholes, the practice of price discrimination thrived as did its beneficiaries. The public interest demanded that something be done, and in response Congress in 1936 enacted the Robinson-Patman amendment to eliminate the defects in the anti-price discrimination section of the Clayon Act.

Most importantly relevant to this discussion, Section 2 of the Clayton Act as amended by the Robinson-Patman Act no longer exempted discriminations in price made in "good faith" to meet competition. The amendment introduced a new Subsection 2(b) which provided that the seller could show that his lower price was made in "good faith" to meet the equally low price of a competitor merely for the purpose of rebutting the preliminary or *prima facie* case made against the seller by the Commission.

In 1945 the Supreme Court in the well-known Staley case had its first opportunity to interpret the meeting-competition proviso of the Robinson-Patman Act. In that case the Court affirmed a decision of the Federal Trade Commission which rejected the defense of meeting competition, and in doing so seemed quite clearly to indicate that the amendment had secured the results which Congress intended. This is the language the Court used:

"It will be noted . . . the defense that the pricing discriminations were made in order to meet competition is, under the statute, a matter of rebutting 'the Commission's prima facie case.' Prior to the Robinson-Patman Amendments, Section 2 of the Clayton Act provided that nothing contained in it 'shall prevent' discriminations in price 'made in good faith to meet competition.' The change in language of this exception was for the purpose of making the defense a matter

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The Kefauver-Patman Amendment: Millstone For Chemical Competition? The authors of the proposed legislation and an Assistant Attorney General discuss this important question

Starts on page 24

The Case for The Kefauver-Patman Amendment

WRIGHT PATMAN
United States Representative

A discussion of what the Equality of Opportunity Bills do and why they are needed might best begin with a discussion of what they *don't* do. And first of all, we can dispose of the questions of freight absorption and foreign "dumping."

Neither of these bills changes the law on freight absorption. The bill which Senator Kefauver introduced in the Senate (S. 11) differs from the bill which I introduced in the House (H.R. 11) only in that Senator Kefauver's bill specifically states that "nothing contained herein shall be construed to alter the law applicable to the absorption of freight or of shipping charges."

Another point which we can dispose of briefly is the charge that the bills will make US producers vulnerable to "dumping" by foreign producers. Foreign producers who wish to "dump" in US markets are not going to have their goods kept out of these markets merely because a US producer meets their price to the first customer to whom the offer is made. They will make the same offer to another customer, and to still another, until either 1) some customer buys the foreign goods or 2) the US price level is driven down. Discriminations by US producers won't help matters. Furthermore, we have other laws and tariff machinery to cope with such "dumping." If these are inadequate, they can be corrected.

Let us come now to the main questions. Why are these bills needed? Why is any restraint on price discrimination needed?

Efficiency vs. bigness

Restraining the practice of price discrimination is merely one step — but an essential one — in accommodating the business system to the survival of the smaller firms. All small firms should not, of course, survive. Some are inefficient, just as some of the giant firms are inefficient. No one would argue that the law should protect the inefficient small firm. But can we also say that no one argues for a law which protects the efficient big firm? That is what the present law does, as we shall see as we consider this matter further.

What do we mean by efficiency? We mean roughly this: When a small firm produces, sells, and distributes goods at a cost per unit which is as low or lower than the big competitor's cost per unit, then the small firm is certainly just as efficient as the big competitor. Under these circumstances the competitive rules should not be so loose that the big firm can destroy the small competitor merely because it is bigger — that is, by sheer abuse of its size. Where the rules do permit this, then the inevitable happens: Small firms are squeezed out and all business becomes more and more concentrated in a few super-giants.

Where great size is an important factor to business survival, other public-interest problems arise. For example, great amounts of capital are needed for a new firm to come into the business, and since great aggregations of capital are hard to raise, new generations of would-be businessmen find opportunity foreclosed. Such trends are contrary to our national ideals, and they have bad effects not only on our economy, but on our political lives.

Our antitrust laws restrain price discriminations, then, for the reasons that price discriminations involve abuse of power. The results of discrimination, whether intended or not, are that the larger firms destroy the smaller competitors, without respect to efficiency or other merits.

Actually, price discriminations work an unfair advantage on the smaller competitor in two ways. First, the big marketer has an advantage over the smaller marketer, even where each has paid equal prices for supplies, raw materials and necessary services. Where the sellers discriminate merely to meet — and not to "undercut"

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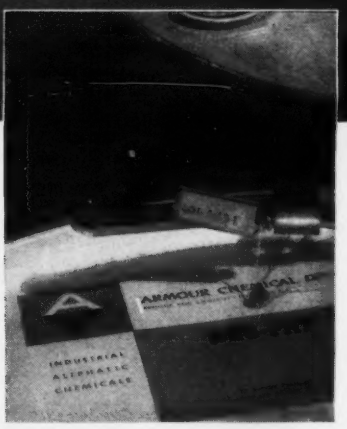
For the views of the Manufacturing Chemists' Association, read "The Kefauver-Patman Amendment: Millstone for Chemical Competition" starting on page ten of June CHEMICAL PROCESSING.

". . . Plant practice requires that the production supervisor be responsible for the quality of product produced in his department . . . Thus full responsibility for in-processing quality remains with production personnel"

What's the best way to maintain quality control in the plant? Armour's Chemical Division uses nearly every possible lab and production control technique. Its . . .

quality control program assures uniform fatty chemicals



CHARLES LANG, Plant Superintendent
VERNE FRANKLIN Chief, Quality Control
Chemical Division, Armour and Company
McCook, Illinois

Problem: Producing 183 different products from six basic raw materials, all naturally occurring fats and oils, Armour and Company's Chemical Division has to make — consistently — high-purity fatty acids and chemical derivatives. These are used in preparation of literally thousands of derivatives for Armour's customers.

Typical of difficulties involved in producing fatty chemicals is that thirteen chemical tests are commonly used to specify characteristics of fatty acids alone. And — fatty acids can be reacted to form amines, amides, nitriles, quaternary ammonium chlorides, esters, to name a few.

Armour's problem is to insure that each lot of fatty acid or fatty-acid product meets specifications — not only those of Armour, but also of the customer.

Solution: Armour's Chemical Division uses nearly every possible lab technique . . . and then makes the plant responsible for maintenance of quality in processing. Armour's plant practice requires each production supervisor to be responsible for quality of product produced in his department.

Laboratory personnel and facilities are under supervision of the Chemical Division's Technical Director. The lab is responsible for quality control and the quality of raw materials. Full responsibility for in-processing quality remains with production people. Finished product quality is the joint responsibility of both lab and production.

"Quality Control" in the plant begins with receipt of raw materials. Every incoming load, by tank car and tank wagon, is melted and sampled by AOCS

Turn to next page

quality control program assures uniform fatty

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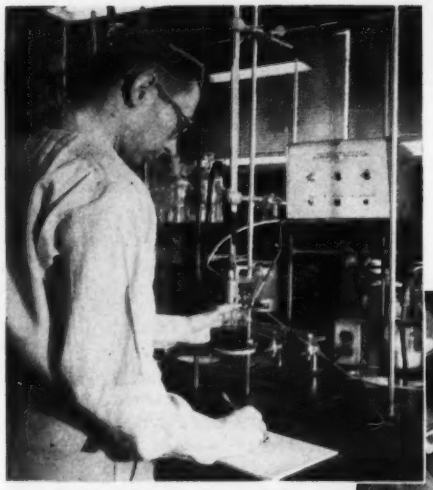
All incoming and outgoing shipments are sampled with AOCS "tryer" by lab. Unloading or dispatching awaits test results

Lab's Stedman still is used to help plant process raw materials, and know in advance what's needed to give uniform product



Better methods of control are always sought. Ultraviolet analysis is used to control feed to nitrile unit. Nitrile products are ultraviolet analyzed . . . data gathered for use as control at later date

Laboratory chemist runs acid values on samples sent from plant. Automatic titration equipment is used whenever possible

"tryer" method. Complete analysis is made including ultraviolet spectrometric tests. Incoming fats are held in stainless-steel tanks until lab tests are complete. Then additional tank-car loads are added to original lot until a manufacturing "run" is accumulated.

First step in producing saleable fatty chemicals is splitting of triglycerides (naturally-occurring fats and oils) by high-pressure steam. Glycerol, as sweet water, and fatty acids results. Then fatty acids are separated according to chain length by fractionation and solvent crystallization. Acids of 90 to 97% purity are obtained. Glycerol is sent to another plant for purification.

After separating the fatty acids, some product lots are sent to a "nitrile" unit for addition of a "—CN" group and then hydrogenated to the amine. Or, lots are sent to other units producing amides and specialties. Amine products of "hydro" unit are starting materials for many amino compounds, such as quaternary ammonium chlorides, amine acetates, and certain secondary and tertiary amines.

Quality Control Program

Simple tests on acid values, saponification values, and percent glycerine are used to control operation of high-pressure-steam splitter. Plant personnel make checks every hour on "splitter" product. Laboratory personnel run a complete check every eight hours, confirming plant results and operational methods.

Both laboratory Stedman and Vigereaux stills are used to set up controls on the fractionating stills. Operational parameters — temperature and pressure — are determined for each lot fed. As a result, processing departments do not waste time — or product

— in setting up each run.

Product stream of nitrile unit is tested for percent free fatty acid by both laboratory and plant personnel. Tests are also made for soap and amide content.

After hydrogenation, amine product is loaded into tank cars for shipment to customers or pumped to storage for further processing. Part of test procedure at the "hydro" unit includes an infrared analysis for radicals that would be missed by "wet" analytical methods. Usual tests for percent nitrile, free fatty acid, and other characteristics are also made.

Control of Shipments

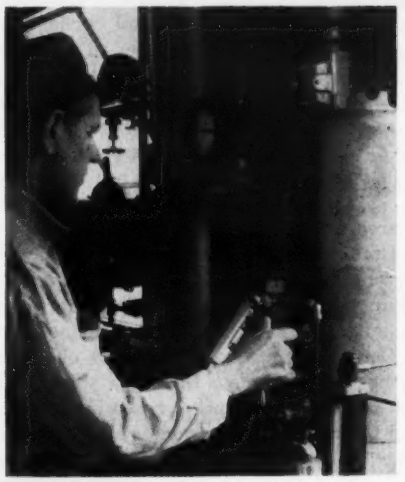
In bulk shipments, laboratory personnel make final inspection of tank cars and tank wagons for cleanliness before loading. Laboratory personnel also check product shipped against specifications — both Armour's and the customer's — and the shipping department awaits an "OK" before loading. After loading, a second "tryer" sample is analyzed by laboratory. Only after a second approval can plant yardmaster dispatch the shipment. Drum stock is handled in a similar manner, being lock-sealed before shipment with production-lot number tag.

Final step in the quality control program is statistical charting of all information on each production lot. Specifications are compared item-by-item with data from previous runs.

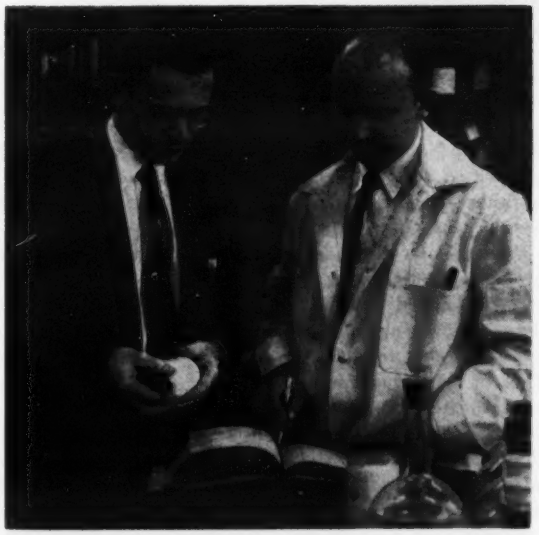
Results: This quality control program — coordinated between production and the laboratory — enables Armour Chemical Division to maintain uniform high quality in all 183 products. Despite the great number of related organic acids which occur in nature, and which are in feed stocks used, Armour has been able to maintain uniformity of product — consistently. ■

Photos by CP staff except where otherwise noted

Typical of measures taken to insure quality is the system of twin stainless steel lines used to transfer materials between units. One system of lines is for products, the other for raw materials. Stainless tanks are used for in-process storage — *Armour photo*

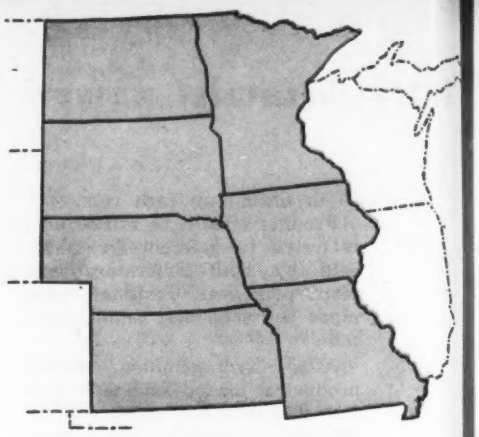


Hygirtol plant operator checks process equipment which controls purity of hydrogen entering into hydrogenation unit



Production and lab cooperation helps devise optimum methods of process control. Plant Superintendent Charles Lang and Quality Control Chief Verne Franklin discuss a problem

Chemical Markets



M. H. BAKER
President, The m. h. Baker Company

Although it produces only about one and one-half percent of US chemicals., the West North Central states area is a major chemical market place. The farmer of the plains states is the greatest single user of chemicals in the region. Chemical fertilizers, insecticides, herbicides, soil conditioners, all are used in huge quantities. The area has paper mills, paint production, food products, and lubricants, all good consumers of chemicals.

The region is a major producer of cosmetics. Rubber products, adhesives, cleaning compounds, and general chemical manufacture and specialties are all a part of the chemical markets offered by the area. And in exploring the area and seeing where chemicals are actually used, we will find a rather confusing pattern of chemical uses.

The area produces approximately 2 percent of all paper made in the United States, and — here is an interesting one — about 2¼ percent of all petroleum products made in the United States. If we lumped in Milwaukee and St. Louis we would about triple all the figures. First of all, we must define the market. The West North Central state area is made up of Minnesota, Iowa, Missouri, the Two Dakotas, Nebraska and Kansas.

When the chemical market researcher begins to evaluate the demand for his products in one given area, he starts by checking the various producers of the material in question. From this starting point, he can frequently make reasonably accurate estimates of the actual market. Unfortunately, this area is not a large chemical producing region and the number of producers are limited. So this method would be pretty uneffective . . . particularly if you're not making a study of where chemicals are sold but where they are actually used.

The largest chemical user in the West North Central United States is the farmer. He is rarely reached directly, but through distributors, so if you are selling chemicals to him you must consider who the distributors are and how they distribute.

Let's deal with the farmer as a chemical consumer and see what he actually buys. For his crops he uses fertilizer of various types — chemical fertilizer, that is, mixed fertilizer; phosphates; ammonias, the growing and preferred fertilizer in this area, — soil conditioners, and soil fumigants. One of the largest applications of chemicals by the farmers next to fertilizers are seed conditioners. Weed killers provide a nice market in this area for chemical products. Fungicides, insecticides and antibiotics go into both the crop and livestock portions of chemical use by the farmer.

He also uses considerable quantities of washing and cleaning compounds. He uses dicholants, he uses rodenticides (and this is quite a market); he uses growth regulators if in the fruit industry, and he uses processing and preserving chemicals — and if he doesn't the people in the small towns who live from the crops that he grows do.

And he buys packaging materials. More and more farmers in the Red River Valley are very good prospects for polyethylene bags in which they pack their potatoes, for example.

In livestock production he uses chemical feed supplements — minerals, vitamins, antibiotics, proteins, these things that Archer-Daniels-Midland, Cargill and others make. He uses pesticides in large quantities, he uses hormone and growth factors, and he again uses washing and cleaning chemicals, and packaging materials for his milk, butter, cheese, etc.

How do you reach the farmer? By and large you reach him through distributors in this area. There are many good distributors who handle the sale of products to the farmer directly or through country elevators. I am not jumping over the direct sales. I am going to deal with that separately.

In order of magnitude, the distributors do the biggest part of the job. We have people like Thompson-Hayward spread all through the midwest who handle quite a lot of agricultural supplements and vitamins, etc., and even the cleaning compounds and similar material. Merchants Chemical, Hawkins, Lyons, and many others exist and do a good job of reaching the farmer with these chemical products.

The Minneapolis-St. Paul area is the third largest distributing center in the US. We have the large merchandising organizations like Farwell, Ozmun, Kirk, and Co., Dan McGill, Gamble-Skogmo, and the Coast to Coast stores, all centering their activities out of the Twin Cities because the market is here. The direct job of selling is done through sales offices of companies like A-D-M and Cargill, through branch offices of some of the major chemical companies such as Dow and Monsanto who sell largely to the country jobbers, country elevators, and country sales outlets.

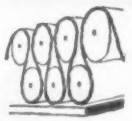
This, then, is actually the largest segment of the chemical consuming portion of the business that is done in the West North Central United States.

Now we turn to the chemicals that we are normally accustomed to looking at — the industrial chemicals. In the area we have paper mills, paint factories, manufacturers of feed stuffs, food products, lubricants, fuels, rubber products, adhesives, cleaning compounds, cosmetics, vegetable oils, general chemical

in the west north central states

manufacture and specialties. I haven't tried to list the industries that exist in this marketing area in any order of magnitude of consumption, but they are roughly in that order.

Let's look at the paper mills first. There are 26 paper mills in this area. They use acids, bleaches, fillers, latices, pigments, dyestuffs, and various other heavy chemicals plus a number of other things not listed here. They vary from the Minnesota and Ontario Paper Company, which is large in newsprint but which also makes insulating board in large quantities, to the Wood Conversion Company which makes all kinds of wood utilization products. The Northwest Paper Company makes book and magazine paper. The Rhinelander Paper Co., which is actually a neighbor but by and large is handled from here, goes into the glassine paper business.



The area also boasts at least two hardboard manufacturers who produce large quantities of high density board.

In the paint industry we have in this area 32 companies ranging in size from a branch of Glidden and Minnesota Paints down to rather small companies producing and selling perhaps $200,000 worth of finished products a year. These companies use pigments, they use oils, resins, and all kinds of specialties. They use latices to make waterbased paint, plasticizers, nitrocellulose (which probably could have been included under the resins), solvents and thinners, preservatives and naval stores in large quantities.

Now we come to the feedstuff industry. There is Nutrena, Peavey, General Mills, Pillsbury — all heavy in the feed business. They buy minerals and vitamins and antibiotics and many of the things which we have mentioned which go in as supplements. They also buy flavors. The food industry in this area is largely confined to the millers and the canners, although there is a small amount of specialty food manufactured.

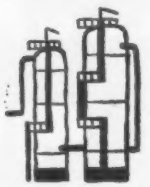
So we can go on to the next one — lubricants. Because the farmer is such a large user of greases for his tractor and equipment, and fuels, there is considerable amount of manufacture of lubricating greases using lithium and other metal salts. This industry uses crude fats from packing house, fatty acids, oils, and alkalies.

"MIKE" BAKER is president of the m. h. ("when I gross more than an annual million dollars I'll capitalize the 'M. H.'") Baker Company. Baker's company serves as manufacturers' representatives, selling chemical raw materials in behalf of firms such as Bordens, General Mills, Amoco, 3M in the North Central States marketing area.

Presently he is Chemical Editor for "The Minnesota Engineer," and Feature Editor of the "Minnesota Chemist," state ACS magazine. He was chairman of the ACS committee which probably sponsored the first US series of scientific television shows.

An early force in the fields of chemical market research and commercial chemical development, Baker is a charter member of both the Chemical Market Research Assn. and the Commercial Chemical Development Assn.

The fuel industry is growing in the area, in that we now have several refineries in the area defined as West North Central. They use acids and alkalies, use some color, they use a lot of fuel additives of one kind or another.



The rubber industry is small in this part of the country, actually consisting of three or four medium-sized companies like Durkee Atwood and Minnesota Rubber, a few tire companies largely centered around Des Moines — Firestone and Armstrong Rubber have plants there — and a lot of little rubber molding plants scattered all through the general area. These people use pigments, carbon black, stearic acid, plasticizers and all kinds of other rubber chemicals and, of course, they buy rubber stock.

We have the adhesives industry which is again small in the area but growing and growing nicely. Of course, the biggest little adhesive company is Minnesota Mining in St. Paul. The second largest in the area, The H. B. Fuller Co., has two branches in the area, one in St. Paul and the other in Kansas City. There are also a number of smaller companies. These companies buy gums, preservatives, latices again, polymers of various kinds, plasticizers, starches and dextrins, thickeners, and so on.

The cleaning compound producing industry is generally small except for Economics Laboratory, which does a good industrial business in the specialized fields. The rest of the manufacturers are mostly left over from the era when there were soap kettles all over the area, although Monarch Chemical, Minnesota Chemical, and National Soap and Chemical are big in dairy cleaners.

The cosmetics industry in this area is an anomaly. There is no great reason why the cosmetic industry should be of good size in this area but this is the third largest manufacturing center for cosmetics in the US following only the very, very busy East Coast and the Chicago area. Minneapolis and and St. Paul — or we should say St. Paul and Minneapolis in this case — provide almost 25 percent of all cosmetics made in the US. The anomaly is the fact that for historic reasons companies like the Toni Company, Raymond

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Taxation

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of taxation be applied to corporations — calibrating the rate to the size of the corporate unit. Here we have *penalty en masse* — a group handicap invoked against the large and successful enterprise because it *is* large and successful.

I suppose that, on the surface, this can be made to appear to be quite reasonable. Certainly it is no less immoral than applying the same premise to personal income. It is based on the "ability-to-pay" reasoning which seems to be well established.

Aside from the moral issue, a discriminatory tax on industry and business must, in the end, penalize our country's development more drastically than it would the corporations'. Whatever might be the rate of corporate tax progression, no one is going to give up many products that can be produced by a large enterprise.

Progressive tax or no, we will have automobiles, and the tax that comes with them will be a penalty paid by the consumer for his transportation. We will continue to have cellophane, and the added cost will be paid by the housewife as she buys her cellophane-wrapped loaf of bread.

To the extent that small enterprises elect to stay small in order to avoid a higher tax bracket, the consumer will be penalized by foregoing the benefits of more economically sized units.

Consequences for Industrial Research

There is a far more important consequence in the realm of industrial research. Large research budgets are justified on the expectation of profit through new commercial ventures — large or small. If research must be directed only to projects which can be profitable in spite of a high tax, we will have to turn our backs on much we are now doing. Smaller enterprises cannot fill this gap, and the

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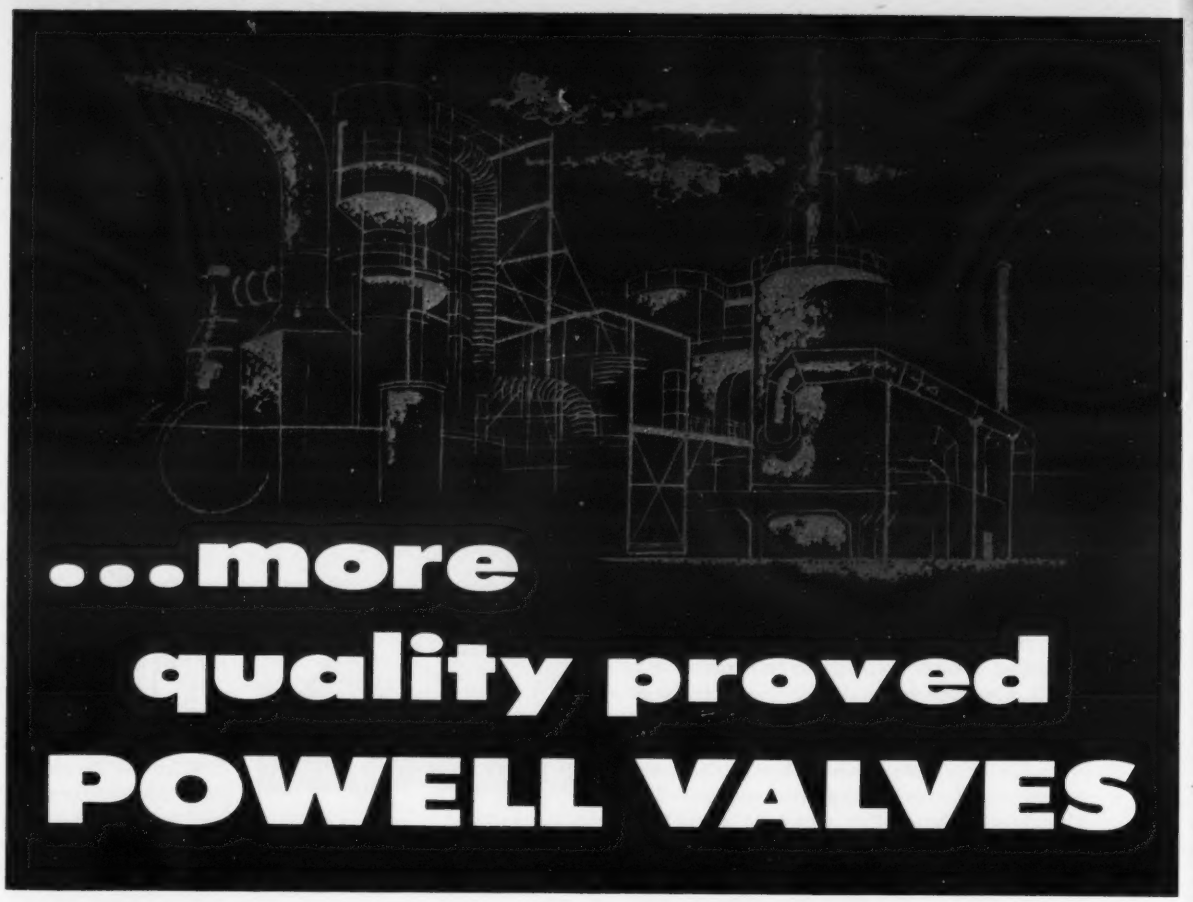


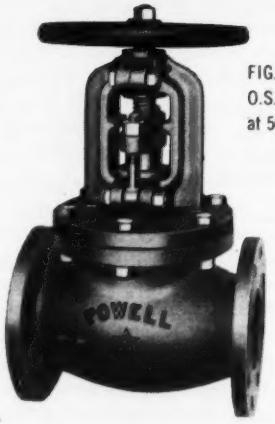
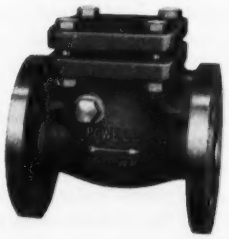


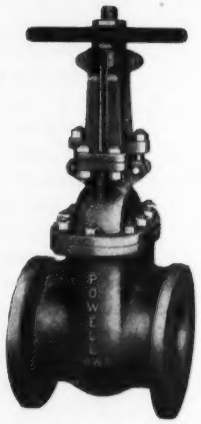
FIG. 2429—Large Size Stainless Steel O.S.&Y. Globe Valve for 150 Pounds W.P. at 500 F. or 230 W.P. at 100 F.

FIG. 1314A—1500-Pound Integral Bonnet Stainless Steel "Y" Valve.

FIG. 2453SG—Stainless Steel O.S.&Y. Gate Valve for 150 Pounds W.P.

FIG. 2342—Stainless Steel Bolted Cap Swing Check Valve for 150 Pounds W.P.





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Check Chart Of RYKON Greases

Regular Line	Grade Consistency
RYKON Grease No. 0	0
RYKON Grease No. 1	1
RYKON Grease No. 2	2
RYKON Grease No. 3	3
Heavy Duty Line	
RYKON Grease No. 0 E. P.	0
RYKON Grease No. 1 E. P.	1
RYKON Grease No. 2 E. P.	2

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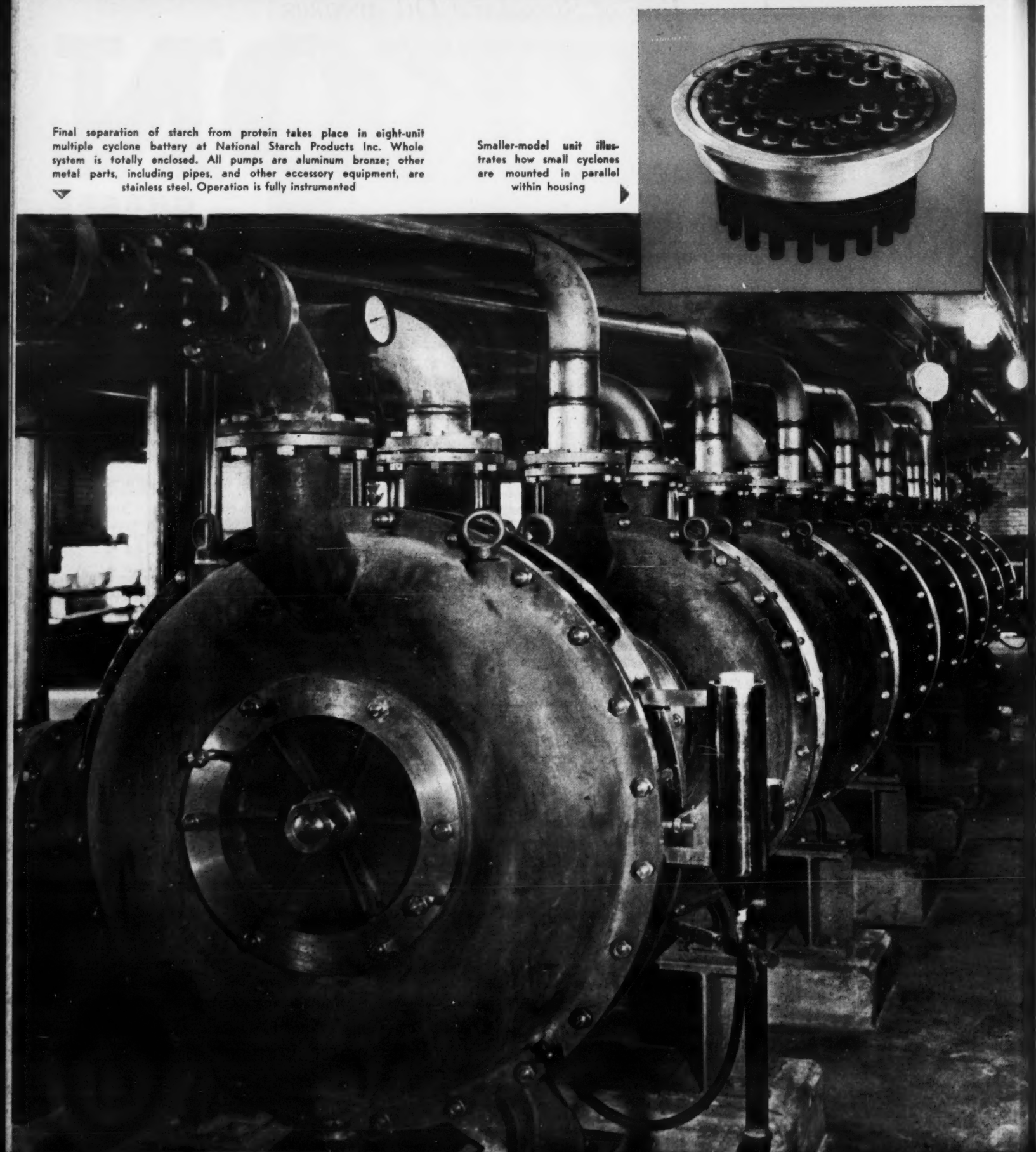
STANDARD

STANDARD OIL COMPANY (Indiana)



Final separation of starch from protein takes place in eight-unit multiple cyclone battery at National Starch Products Inc. Whole system is totally enclosed. All pumps are aluminum bronze; other metal parts, including pipes, and other accessory equipment, are stainless steel. Operation is fully instrumented

Smaller-model unit illustrates how small cyclones are mounted in parallel within housing

Improved separation in the 1 to 10 micron range, using miniature cyclones . . .

ASSURES PURER STARCH PRODUCT

LES MOBERLY,
Supervisor of Engineering,
National Starch Products Inc.
With CP Staff

A small cyclone separator is the key to a more efficient starch processing operation at the Indianapolis plant of National Starch Products Inc. Only 6" long by ¾" in diameter, some 480 of these cyclones are connected in parallel to form a multiple cyclone separator. Eight of the units are in turn connected in series in this installation (see photo on opposite page).

Formerly, average protein content for packed-out starch products was 0.35% — with the new separating units, it is only 0.26%. This improvement in its products is the result of a large expansion program by National Starch, begun in 1956. Then, they decided to increase grind rate, meaning that additional starch-gluten separating equipment would be required.

The desired separation could have been achieved by using more of the centrifuges already in the line. (These centrifuges have been used widely throughout the industry to replace settling tables in wet processing of starch. They almost instantaneously do a better job than the tables did in eight hours). It was decided, however, to use a new type of centrifugal separator.

In this new separator, centrifugal force is created by forcing the liquid containing suspended solids to whirl around in a stationary cyclone. This action is in contrast to the centrifuge, where the whirling action is created by introducing the liquid into a rapidly revolving rotor or basket.

Design of separator is based on principle that as diameter of a cyclone is decreased, fineness of classification is increased. In order to secure production capacities with these small units, a large number of them are mounted in parallel.

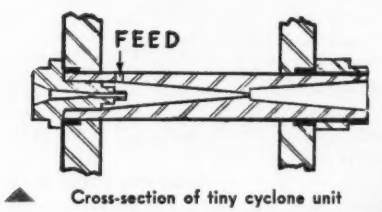
For a given separation, an installation of cyclones and centrifuges costs about the same. Operating costs are also about the same — centrifuges take more power but fewer units are required. Advantage of the cyclone is that since there are no moving parts, maintenance costs are negligible; and operation is simpler.

In the processing line at National Starch, centrifuges are used for mill-starch thickening, primary separation, and gluten thickening. Final separation of starch from protein takes place in the eight-unit multiple cyclone battery.

Heavy underflow liquor pumped from centrifuges is introduced tangentially and simultaneously into the tiny cyclones within the separator. As material swirls, starch, which has a higher specific gravity than gluten, is thrown outward to the walls of the cyclone, where it collects and passes out of the unit through the underflow opening into the common underflow reservoir. Light gluten particles move inward where, with most of the water, they pass through the overflow opening and into the common overflow reservoir.

Capacity of each individual cyclone is rated at about 1.0 gpm at a 40-psi pressure drop. Final underflow effluent discharged from the eighth stage unit is further treated as necessary to produce various specialty starches and derivatives.

(Dorr-Clone separators and Merco centrifuges used in plant are product of Dorr-Oliver Incorporated, Dept. CP, Stamford, Conn. . . . or for more information check 4436 on form opp. last page.)



▲ Cross-section of tiny cyclone unit

Cyclone is constructed of molded Bakelite or nylon ▶

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When inquiring check 4437 opposite last page

Taxation

Starts on page 23

result will be a slowing down of technological progress.

The danger of progressive taxation of corporations lies in the attitude that somehow we can attain progress by making progress unprofitable, that we can further achievement by rendering achievement unattractive. It is one more step toward the point where the burdens of accomplishment begin to outweigh the rewards.

I believe that diminishing incentive is the most critical long-range problem of business today and, by corollary, of the nation itself. The big things, the worth-while things in this country have always been the result of an extra effort, or something a little beyond expectations. To expect that extra effort when incentive is lacking is to cast human nature into a new and unfamiliar mold.

While many people are motivated by doing good for mankind or other high purposes, most of us have somewhat more personal objectives. Incentives differ with different people. Prestige attracts some, for others it is leisure time to follow scholarly pursuits or perhaps simply to commune with their souls. To some, public notice or signs of rank and importance are alluring goals. For most, however, the strongest and most desirable incentive is financial reward.

It is not my purpose to debate the relative nobility of these inducements, although I see no reason to believe that financial gain is any less desirable than prestige or recognition, and it is certainly less stultifying than the lust for power or of mere social distinction. The question of worthiness is not appropriate to this discussion. The important thing is that people be encouraged to give that extra effort, for routine and indifferent performance brings similar results.

None of us are immune. As financial rewards are whittled

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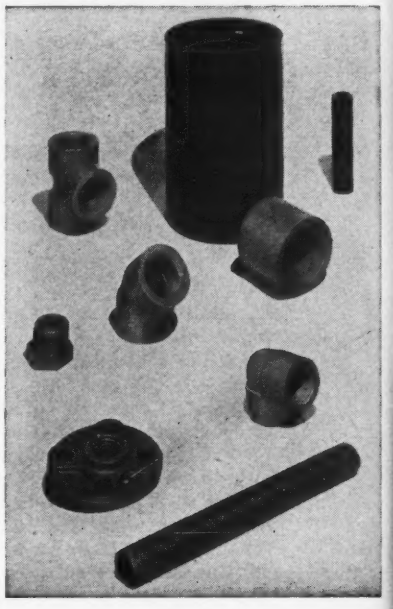

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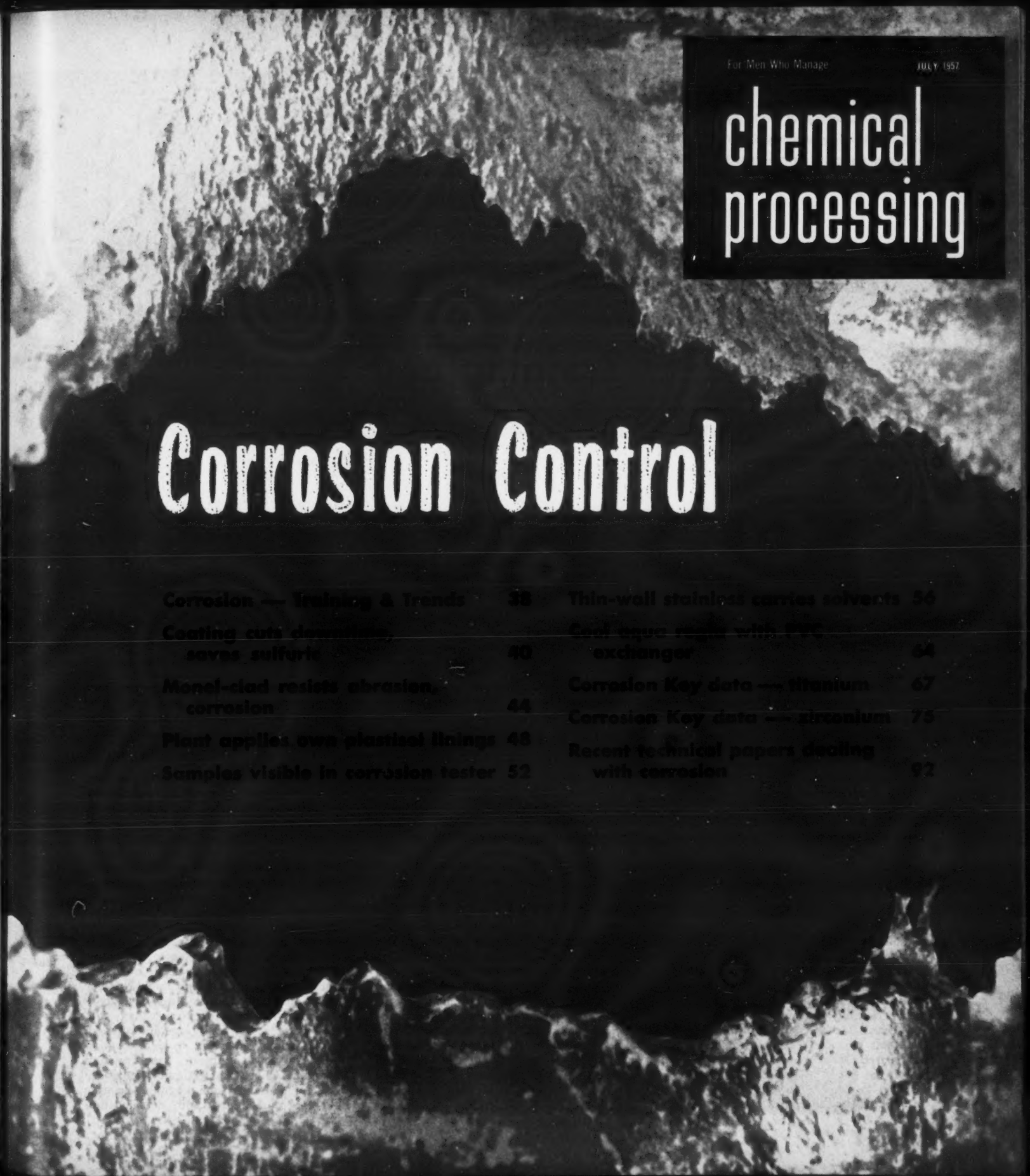
For Men Who Manage JULY 1957

chemical processing



Corrosion Control

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Coating cuts downtime, saves sulfuric 40

Monel-clad resists abrasion, corrosion 44

Plant applies own plastisol linings 48

Samples visible in corrosion tester 52

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Cool aqua acids with new exchanger 64

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Recent technical papers dealing with corrosion 92

To take full advantage of constantly improving services and products offered by companies in corrosion control and to meet challenges of new fields such as nuclear energy, more and better-trained corrosion engineers are needed.

CORROSION

Training and Trends

DR. W. F. FAIR, JR.,
Coatings Consultant, Koppers Company, Inc.
President of National Association of
Corrosion Engineers, 1956-57

THE high cost of corrosion in the United States — estimated to be some six to eight billion dollars per year — may be even higher in some areas if management personnel neglect proper planning for corrosion mitigation. Importance of having trained corrosion engineers, with authority, in chemical processing plants was emphasized in an editorial by F. L. LaQue that appeared one year ago in this magazine (July 1956, page 8). Improved facilities for training of corrosion engineers are needed if chemical processing plants are to take full advantage of services and products offered by companies in the corrosion control field.

EDUCATION

Today we have little formal education of corrosion engineers. In 1954 only 550 students were taking one or more courses in corrosion — usually elective and part of a chemical or metallurgical engineering curriculum — in about 100 engineering schools in the United States. Just as corrosion education leaves something to be desired, volume of fundamental research is small — possibly being underway in hardly more than a dozen universities in the country. Actually, the professional corrosion engineer has become a specialist in his field through self-imposed post-graduate study, practical field and plant experience, company training courses, or frequently a combination of all three. In many instances, emergency conditions have brought engineers trained in other fields into contact with corrosion problems. A chemical engineer suddenly finds that he is a corrosion engineer.

The National Association of Corrosion Engineers is fully aware of the importance of corrosion education and is doing something about it. Every year several short courses in corrosion are co-sponsored at different engineering schools and universities.

The NACE also provides means for discussion and exchange of ideas and experiences in dealing with corrosion problems on sectional, regional, and national meeting levels. NACE Technical Committees authorize publication of technical papers and recommended practices for the benefit of all industry. These activities could not have been fostered or expanded in scope without the continued support — moral and financial — of those industrial concerns that hold Corporate Membership in the NACE.

FUTURE NEEDS

It seems certain that more trained corrosion engineers will be needed for new activities. For example, increased supplies of potable water must be economically transported in pipelines throughout the country to overcome drought conditions in various areas and supply the requirements of our increasing population. Several have suggested that solar energy, efficiently applied, might be used to distill sea water. The purified water could then be used to irrigate arid but fertile lands. Both the distillation and transportation of this water introduce problems for the corrosion engineer.

Nuclear energy is another field that will present increasing challenges to technical and engineering groups, including corrosion engineers. Reactor problems are many — including fuel handling, piping, sealing, and effluent lines. Nuclear energy plants need stable protective coatings, and these coatings must have the property of being easily decontaminated. Special alloys, resistant to deterioration under service conditions, are specified throughout these plants. Important questions for the corrosion engineer in this field deal particularly with deterioration

DR. W. F. FAIR, JR., Coatings Consultant, the Koppers Company, was President of the National Association of Corrosion Engineers during this past year. His work at Koppers and his varied activities in the NACE have caused him to travel extensively and have given him a keen perception of corrosion in all its phases.

He received an AB degree from Harvard College and a MA and PhD in chemistry from Columbia University. His past experience includes research for the Barrett Division of Allied Chemical and Dye Corporation, several years as Professor of Chemistry at Manhattanville College in New York City and Senior Fellow at Mellon Institute.

by radiation — and more particularly with the grave problem of disposal or storage of radioactive fissionable waste products, some of which have half-lives of up to 100 years.

RECENT DEVELOPMENTS

Although corrosion engineers must face increasingly complex problems, more and better methods for solving them are becoming available. A promising development is the technology of titanium and its alloys. Another is zirconium. Thin Monel sheathing about 0.037" thick has been successfully used for protecting offshore structures from salt water. Sprayed metallized coatings are increasingly being used for protection and rebuilding of corroded surfaces. Fusing in place of properly selected combinations of metals, sometimes used with liquid synthetic coatings, can be specified to meet a wide variety of service conditions.

Corrosion protection is afforded by the use of inhibitors in cooling water — sometimes two or more inhibitors in combination being most effective. Organic inhibitors have found increased use in refining operations, storage tanks, and

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Latest developments in corrosion control are exhibited at the 1957 Annual Meeting of the National Association of Corrosion Engineers held in St. Louis

Dr. Fair at the 1957 Annual Meeting of the NACE. Such meetings provide a means for mutual exchange of information on battling corrosion

Acid pickling tanks had to be repaired every week. With coal tar-epoxy protection . . .

COATED ACID TANKS LAST 50 TIMES LONGER

FRANK E. McELROY, Associate Editor
With **DONALD S. CHAMBERLAIN,** Technical Supervisor
The American Brass Co., Ansonia Division
Ansonia, Connecticut

Problem: The same property — namely that of reacting with metal — that makes sulfuric acid of great value in cleaning the surface of copper and copper alloy strips before annealing also makes it a problem to find ways to keep it from eating through pickling tanks.

Pickling units at the Ansonia Division of The American Brass Company were down about once a week for repair of leaks. When the 10% H_2SO_4 contained in the tanks ate through the ⅛ to 3/16 inch 316 stainless plate, the entire 800 to 1000 gallons of acid had to be drained before the tank could be welded. This was a time-consuming and costly operation.

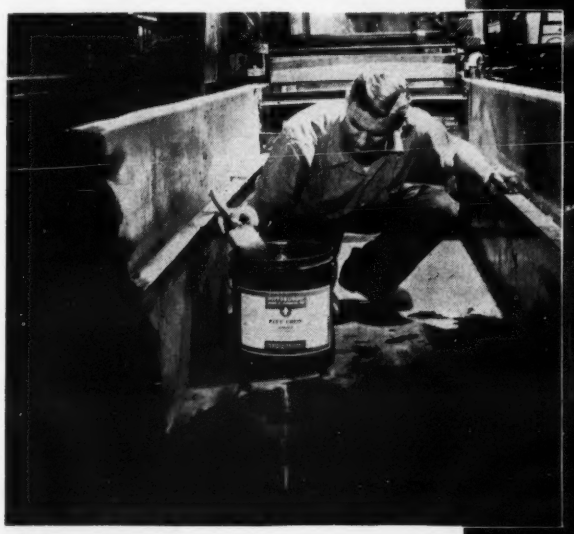
Solution: About a year ago, the Ansonia plant started experimenting with an epoxy-coal tar coating for lining the pickling tanks. They found that best results were obtained when the tank was drained, washed thoroughly with water, and any scale was brushed off. One coat of the Tarset coating was brushed on. Final film thickness was about 16 mils.

Tank interiors were painted on Saturday morning, and were ready for filling early Monday morning. To brush scale and coat a 1000-gal pickle unit took two men about a full eight hours. About five gallons of coating was used, at a cost of about $60. Coating used is a combination of coal tar pitch and epoxy resin. It resists the action of salts and oil products as well as acids, and can be used at temperatures from 30° to 400°F.

Making necessary repairs is easy. Ansonia Division removes previous coating by softening with heat and scraping, prior to welding and recoating.

Results: Epoxy-coal tar coating has prolonged the interval between repairing leaks of pickling tanks from about one week to twelve months. Besides direct savings in labor costs and downtime, savings in sulfuric acid amount to thirty-three 12½-gallon carboys of 66°Be acid every month.

(Tarset coating is product of Protective Coatings Div., Pittsburgh Coke and Chemical Co., Dept. CP, Grant Bldg., Pittsburgh, Pa. . . . or for more information check 4438 on form opp. last page.)



Epoxy-coal tar coating is brushed on, after washing and wire-brushing inside of the acid pickling tanks. Work was done Saturday, and tanks were ready for use the following Monday

Copper strip passing through pickling bath is checked by Foreman William Yoxal. Stainless steel splash plates, shown on sides and top of tank, are installed over Tarset coating on the tank

DORÉ INTRODUCES NEW QUALITY CONTROL CHECKS AND CHARTS TO ASSURE OPTIMUM SAFETY AND PERFORMANCE

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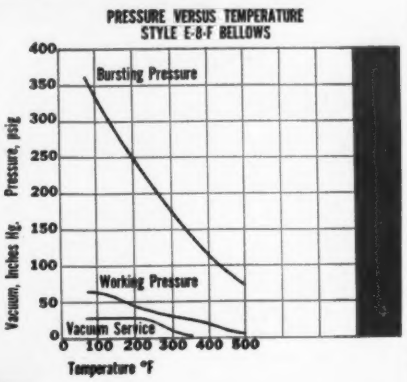

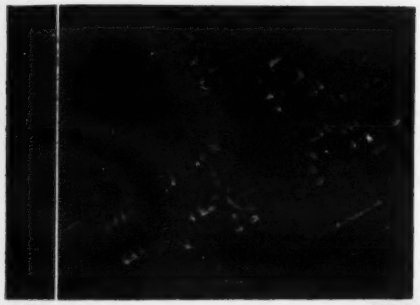

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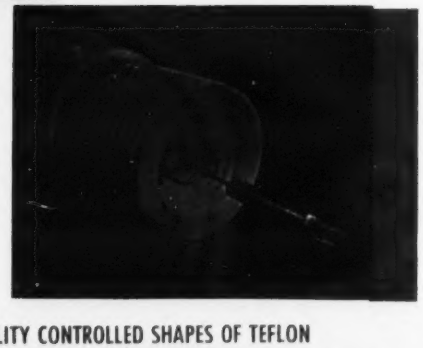

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CORROSION

Cathodic protection guards large fire-water tank at Westvaco

Original cost of cathodic protection system only $875

Problem: At the end of two years service, a fire water storage tank showed incipient failures and surface irregularities of protective coating throughout interior immersed surface of riser and vessel at the rivets, welds, and plate edges — as well as a number of blisters. Water tank is in use at the Westvaco Clor-Alkali Div., Food Machinery & Chemical Corp., South Charleston, W. Va. Tank is an elevated structure of 100,000 gal capacity, 171′ high. Dimensions of tank itself are: height 48″ and bowl diameter 24′. The 4′-diameter riser pipe extends 122′ from ground level.

Cathodic protection is used in this 100,000-gal water tank at Westvaco, to prevent corrosion

Tank was originally placed in service in 1950 after being sandblasted and lined with a conventional paint system. Inspection in 1952 indicated that further protective measures would have to be taken to prevent serious deterioration of tank.

Solution: On the basis of an economic analysis, a cathodic protection system was installed in tank in Aug. 1953. Type 17ST4 aluminum anodes suspended from pin-type insulators were used. One long anode was installed in 4′-diameter standpipe. Paint repairs were also made.

Cathodic protection system includes a 5½-amp, 34-volt rectifier installed to deliver

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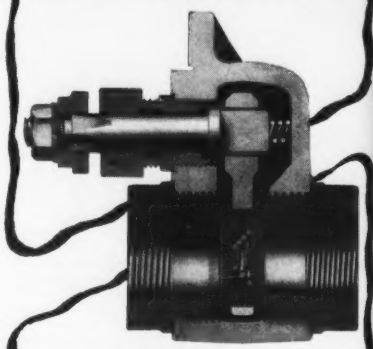

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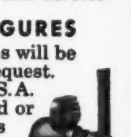

• Write for Bulletin CP6

Okadee COMPANY
332 SOUTH MICHIGAN AVENUE
CHICAGO 4, ILLINOIS

When inquiring check 4440 opposite last page

current to anodes. Handholes were cut and fitted with covers at each anode location to facilitate servicing. Some adjustment of current was made after original installation. Present applied current is approximately 3.0 amp on bowl and 2.0 amp on riser.

Results: Fire-water storage tank has been adequately protected by the cathodic protection system. Original cost of cathodic protection system was $875. Annual cost for maintenance, power, and depreciation is estimated to be $243. Hence, protection is being provided at a quite low comparative cost. When anodes are changed, tank does not have to be emptied.

(Cathodic protection system was engineered and installed by Electro Rust-Proofing Corp., Dept. CP, 30 Main St., Belleville 9, N. J. . . . or for more information check 4442 on form which is located opposite last page.)

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Holds hardness up to 77°F, resists acids, grease

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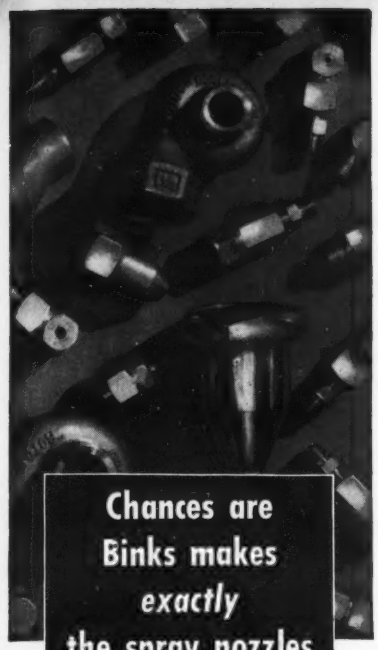
Description: Material is specially compounded bituminous mastic. It can be installed over any solid base such as concrete, brick, or wood and be ready for use within four hours after installation. Installed cost is approximately one half that of carbon brick for acid service.

(Ferrolite floor is supplied by Fulton Asphalt Co., Dept. CP, 165 W. Wacker Drive, Chicago, Ill. . . . or for more information check 4443 on form opposite last page.)



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When inquiring check 4444 opposite last page

In handling 50% liquid caustic soda containing suspended silica under pressure at 350°F, steel autoclaves had useful life of only about three years. To lengthen service life, Westvaco went to Monel-clad, which —

WITHSTANDS AND

View of interior of one vessel shows suspended 2½"-diameter Monel agitator shaft with its two Monel flat-blade turbine agitators. At upper left is one of the four solid Monel baffles attached to side wall

Two of the Monel-clad autoclaves (center and left) in service at Westvaco

CP Staff Photo

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Over

AGGRESSIVE CORROSION ABRASION

WILLIAM VAN VLIET BACON,
Chief Material and Inspection Engineer
Westvaco Chlor-Alkali Division
Food Machinery & Chemical Corporation
South Charleston, West Virginia
With **GORDON WEYERMULLER,** Associate Editor

William Van Vliet Bacon, known as Van to his associates, is the chief corrosion engineer of Westvaco. He is a charter member of the Chemical Group of the Sea Horse Institute of International Nickel. He is a member of the ASTM and the AICHE. Van thrives on difficult corrosion problems. His work at South Charleston and other Westvaco plants has saved his company many thousands of dollars. Van received his BS degree in Chemical Engineering from Princeton University.

Problem: Corrosion caused by caustic and abrasion from suspended silica limited the life of large steel autoclaves to about three years. Vessels were in use at the Westvaco Chlor-Alkali Division of Food Machinery in South Charleston, W. Va. The autoclaves were utilized in the production of Magnesol (magnesium silicate), which is an industrial absorbent powder.

In the manufacture of Magnesol at Westvaco, sodium silicate is one of the basic raw materials. Sodium silicate of the desired alkalinity is produced by the batch digestion of an excess of pure silica flour (95% passing through 200 mesh) in 50% liquid caustic under pressure at 350°F. Throughout the digestion period, the batch is agitated in order to maintain the silica in suspension.

Use of 1¼" carbon steel for the inner shell of the jacketed vessels (150 psi, ASME code) in which the foregoing reaction takes place resulted in excessive maintenance and replacement costs.

Solution: Field corrosion tests made in the operation indicated a probable minimum life of 10 years for a Monel-clad vessel having a minimum clad metal thickness of 0.125". Economic considerations based on this better than three to one life superiority justified a switch from steel to alloy-clad construction. Accordingly, the first autoclave with all surfaces in contact with reaction protected by Monel was constructed and placed in service in December 1950.

Overall dimensions of the vessel are 13'5" height and 6'8" ID for shell. Shell is 1¾" 10% Monel-clad steel — top head is 1¼" 15% Monel-clad steel — and bottom head is 2" 10% Monel-clad steel. Jacket shell is 1" carbon steel and jacket head 1¼" carbon steel. Four ¾"-thick solid Monel baffles were attached to the side wall of the vessel. Agitator used in vessel is a 7½-hp unit operating at 100 rpm, and is constructed of all parts entering or within vessel of solid Monel. Extreme care was taken in welding Monel to avoid iron dilution of weld. Construction of this vessel was in strict accordance with the ASME code for unfired pressure vessels, paragraph U-68. Welds were X-rayed and the completed vessel stress-relieved. Unit was shop hydrostatic tested at 350 psi for an operating pressure of 175 psi. When initial inspection after a few months service confirmed anticipated good performance of vessel, a second Monel-clad vessel was ordered, which was placed in service in Feb. 1952. Later a third vessel of this type was installed.

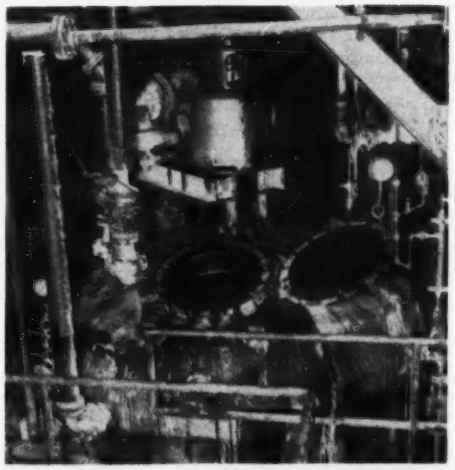
Results: Monel-clad vessels are still in excellent condition with up to six years of nearly continuous service. Use of this type of construction has resulted in a considerable saving in maintenance and replacement costs.

(Monel-clad steel plate and heads were furnished by Lukens Steel Company, Dept. CP, Coatesville, Pa. . . . or for more information check 4445 on form which is located opposite last page.)

(Solid Monel parts were supplied by International Nickel Co., Inc., Dept. CP, 40 Wall St., New York, N. Y. . . . or check 4446 opposite last page.)

(Model TEC Lightnin Mixer is product of Mixing Equipment Co., Inc., Dept. CP, 135 Mount Read Blvd., Rochester 11, N. Y. . . . or check 4447 opposite last page.)

(Vessels were fabricated by The Colonial Iron Works Co., Dept. CP, 17645 St. Clair Ave., Cleveland 10, Ohio . . . or check 4448 opposite last page.)



Top of one vessel, showing agitator drive mechanism and open manway with the Monel surfaces extending outward to bolt circle

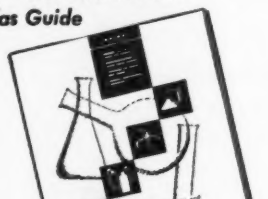
ATLAS

CHEMICALS DIVISION
ATLAS POWDER COMPANY, WILMINGTON 99, DELAWARE
Atlas Powder Company, Canada, Ltd., Brantford, Ontario, Canada

...FOR PETROLEUM CHEMISTS
—Cronox Corrosion Inhibitors

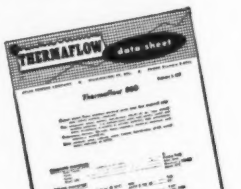
If you're concerned with corrosion-prevention programs in producing wells, water floods and disposal systems, and refineries, you'll find much to interest you in this new booklet published by our Aquaness Department. It describes the comprehensive line of Cronox organic corrosion inhibitors, bactericides and combination bactericide-inhibitors. For a copy, check the coupon below.

...FOR COSMETIC FORMULATORS
—Atlas Guide



Laboratory costs for new product development can be reduced, and research time shortened, with the help of data contained in the "Atlas Guide to the Use of Sorbitol and Surfactants in Cosmetics." This 36-page book is full of time-saving tips on Cosmetic formulating theory and practice, including details of the Atlas HLB System of emulsifier selection. Check coupon below to receive your copy.

...FOR PRODUCT DESIGNERS
—Atlac Thermaflow 800 Reinforced Plastic Molding Compound



Of particular interest to those who design military equipment is a new reinforced polyester that has exceptional strength/weight ratio, superior corrosion resistance and ready moldability in large and complex shapes. It is designed to meet specification MIL-M-14E for type MA1-60 glass fiber reinforced molding compounds. Check coupon below for Bulletin.

ATLAS POWDER COMPANY
Dept. ASP
Wilmington 99, Delaware

Please send me the Atlas literature checked.

☐ *Cronox Inhibitors*
☐ *Atlas Cosmetic Guide*
☐ *Atlac Thermaflow 800*

*Name*_____ *Title*_____
*Company*_____
*Address*_____
*City*_____ *Zone*_____ *State*_____

When inquiring check 4449 opposite last page

CORROSION

Good corrosion resistance for synthetic rubber in HCl service

Tests on man-made product show superior results

Uses: Protective linings or coverings against chemical corrosion.

Features: Extensive chemical resistance tests indicate that man-made rubber is equal, and in some cases superior, to crude rubber as a barrier to chemical corrosion. Reaction to concentrated hydrochloric acid is same as crude rubber.

Description: Ameripol SN is a synthetic rubber that duplicates tree rubber. It can be processed similarly to crude rubber during manufacture.

(Ameripol SN is a product of Goodrich-Gulf Chemicals, Inc., Dept. CP, Rose Bldg., 2060 E. 9th St., Cleveland 15, Ohio. . . . or for more information check 4450 on the convenient Reader Service slip which is located opposite last page.)

Titanium rack paid for in reduced maintenance within 30 days

No design changes required in replacing former racks

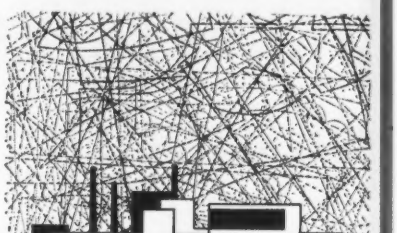
Problem: Maintenance costs on anodizing racks at Carlson Erie Corp., Erie, Pa., were beginning to cut into profits. Every 10 days, 10 racks were cycled for maintenance. These had to be restored to production service within 10 days to replace 10 more racks being withdrawn from service at rate of one per day due to corrosive action of anodizing solution.

Solution: A rack was fabricated from a commercially pure titanium alloy with an average yield strength of 75,000 psi. No special welding equipment or cleaning procedures beyond normal were required. No unusual welding skill was necessary.

Results: Based on high maintenance costs incurred with former units, titanium rack

SITUATION WANTED

PLANT NEEDING HEAVY DUTY CORROSION PROTECTION



If paint is doing a satisfactory job of protecting your plant structure or equipment against chemical fumes, splash or spray, stop right here. If not, GACO Neoprene N-700 Maintenance Coating is a product you should know about. It wraps a film of tough, elastic Neoprene rubber around metal, wood, or concrete; offers the advantages of higher resistance to corrosive agents, wide temperature ranges, sunlight, weathering, surface abrasion—and at lower applied cost.

GACO
THE MARK OF CORROSION PROTECTION

GACO Neoprene STARTS work where the toughest paints fail

You get a back-log of almost 20 years of experience in corrosion control among the top names in U.S. Industry when you specify GACO Neoprene Protective Coatings. And there's an entire family of GACO products and services available including field technicians, laboratory, fabrication, and lining facilities. A GACO Corrosion Specialist in your area is prepared to serve you. For complete information, write—we'll forward literature of interest.

GATES ENGINEERING COMPANY
Wilmington 99, Delaware

Pioneer Leader In Protective Coatings

Authorized Distributors in principal cities U.S.A. Australia. Belgium. England. Finland. France. Israel. Japan. Norway. Okinawa. Philippine Islands. Puerto Rico. Sweden. In Canada: Gaco Products Ltd., Brantford, Ontario.

When inquiring check 4451 opposite last page

FERROLITE
REG U S PAT OFF

HEAVY DUTY ACID-PROOF FLOORS

FERROLITE is a very hard, yet resilient, acid and waterproof, jointless type of floor finish. FERROLITE can be installed over any type of solid base such as wood, concrete or brick and will withstand concentrated floor loads of over 600 lbs. per square inch without indentation. FERROLITE COLORS are Red, Brown, Gray and Black.

ADVANTAGES —

FERROLITE Finishes are jointless, very homogeneous, easily kept clean, harden like stone and can be put into service 4 hours after installation. FERROLITE is elastic, resilient under foot, AND — it's ACID-PROOF. Also oil and grease proof FERROLITE is available.

APPLICATIONS —

Both the acid-proof and standard FERROLITE Floor Finishes are especially suited for chemical plants, plating rooms, acid processing plants, food plants, paint and varnish plants, in fact wherever chemicals or acids or a combination of both create a flooring problem.

INSTALLATION —

FERROLITE is installed in varying thicknesses of 1" up from thermo-regulated mobile power units especially designed in Europe and now available through Fulton in this country. All Fulton installations are made with our trained floor crews under our supervision which guarantees both quality of workmanship and uniformity of the finished product.

Write, wire or phone today to

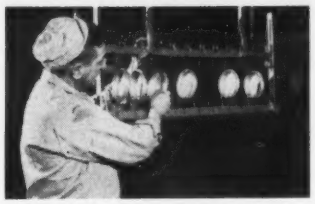
FULTON ASPHALT COMPANY

Specialists since 1870 in quality floors

165 W. WACKER DR., CHICAGO 1, ILL.

PHONE: RAndolph 6-1760

When inquiring check 4452 opposite last page



Titanium anodizing rack paid for itself within 30 days by reducing maintenance costs

paid for itself within 30 days. In addition greater strength found in titanium permitted reduction in overall dimensions and other processing refinements.

No design changes were necessary in manufacture of all-titanium rack. Success of first test unit has led to replacement of entire 104 racks used in anodizing operation.

(Titanium used for anodizing rack was supplied by Johnston & Funk Titanium Corp., Dept. CP, Wooster, Ohio . . . or for more information check 4453 on form which is located opposite last page.)

Acid-proof masonry cement resists acids, alkalis, solvents

Suitable for temperatures to 380°F

Uses: For brick-lined vessels and floors handling corrosive chemicals.

Features: Three to six hours working life of the cement saves labor of mixing and laying. Product is thixotropic — it does not sag or bleed. It also has excellent shelf life.

Description: Cement is poly-furfuryl alcohol resin base material. Mortar is smooth and creamy and stays where troweled due to its thixotropic quality. It will hold a brick to any dry surface in the inverted position. It lays smooth and clean.

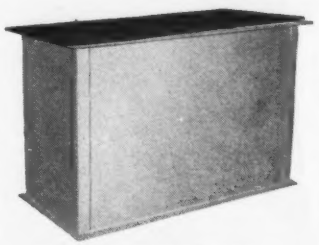
(Eonite masonry cement is product of Cornelius A. Rauh & Associates, Inc., Dept. CP, 1191 Sunset View Dr., Akron 13, O. . . . or for more information check 4454 on form opposite last page.)

add complete

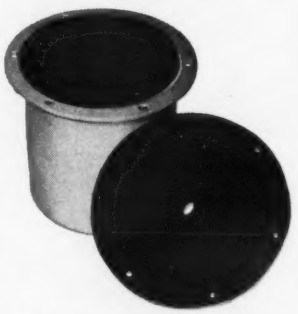
CORROSION RESISTANCE

Trailer Tank lined with KEL-F Laminate for large commercial hauler of acids, alkalies, oxidants and solvents.

...with KEL-F LAMINATE lining



100 gal. Tank lined with KEL-F Laminate handles acid fluorides.



Reactor-pot, cover and nozzles lined with KEL-F Laminate.

Make ordinary equipment—tanks, vessels, pipe, chutes, ducts, hoppers, vats, drums—resistant to gases and liquids as corrosive as fuming nitric acid—with KEL-F Laminate.

TOUGH—SHATTERPROOF—KEL-F* Laminate is a durable, abrasion resistant, chemically inert fluorocarbon plastic, bonded to a glass-cloth backing for maximum adhesion. It is readily cemented to any material of construction—metal, wood, concrete, etc.—and over a variety of contours.

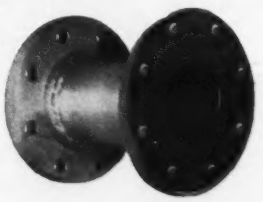
HEAT-SEALED SEAMS—KEL-F being a thermoplastic resin, seams may be "welded", on the job by the thermal pulse technique, into a continuous lining having zero water absorption and extremely resistant to acids, alkalies, oxidants and solvents at temperatures up 350°F.

CERTIFIED APPLICATORS—KEL-F Laminates are manufactured by the United States Gasket Company, pioneers and leaders in fluorocarbon plastics, and are available for installation by certified applicators. Write for further information and the name of applicator nearest you.

UNITED STATES GASKET COMPANY
Camden 1, New Jersey

*Trademark, Minnesota Mining & Mfg. Co.

4-inch pipe coupling lined with KEL-F Laminate for sulfuric acid service.



United States Gasket *Plastics Division*
OF THE GARLOCK PACKING COMPANY

When inquiring check 4455 opposite last page

BEFORE YOU SPECIFY PROCESSING EQUIPMENT MAKE SURE YOU HAVE THE LATEST INFORMATION AND COST DETAILS ON

Impervite

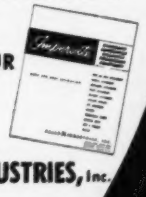
IMPERVIOUS GRAPHITE EQUIPMENT

• Do you want a rupture disk, the burst characteristics of which are not affected by changing temperature? Do you want a simply constructed, self-cooling chemical pump which is virtually leak-proof? Need a heat exchanger that takes up less space for a given amount of transfer surface? Need a complete HCL plant? . . . towers? . . . pipe? . . . fittings? . . . valves?

When processing equipment is produced from IMPERVITE graphite, many outstanding advantages can be obtained at a surprisingly low cost. Some of the unusual properties of IMPERVITE include immunity to thermal shock, high rate of thermal conductivity, and ability to withstand the attack of practically all corrosives, except a few strong oxidizing agents.

Before you specify any processing equipment, make sure you know the cost of standard IMPERVITE equipment. Bulletin No. 249 shows a typical drawing or illustration of each type of equipment, lists the standard models available, and charts the cost per square foot of heat transfer area, or other convenient unit.

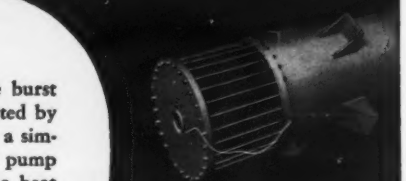
WRITE FOR YOUR COPY TODAY



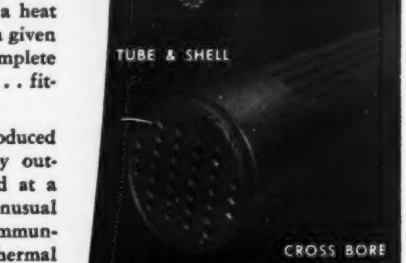
FALLS FI INDUSTRIES, Inc.

31909 AURORA RD.
SOLON, OHIO

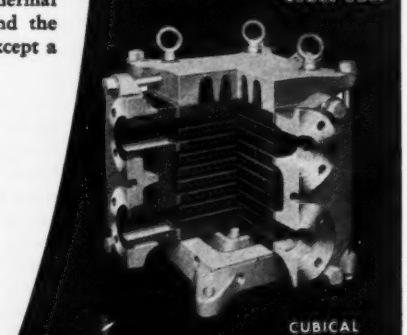
PHONE: CH. 8-5357
TELETYPE: SOLON-0-720



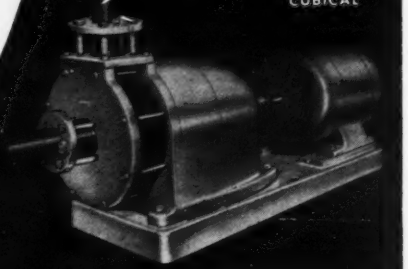
TUBE & SHELL



CROSS BORE



CUBICAL



CENTRIFUGAL PUMPS

RUPTURE DISKS

TOWERS

When inquiring check 4456 opposite last page

Metal part is dipped in liquid PVC at Courtaulds

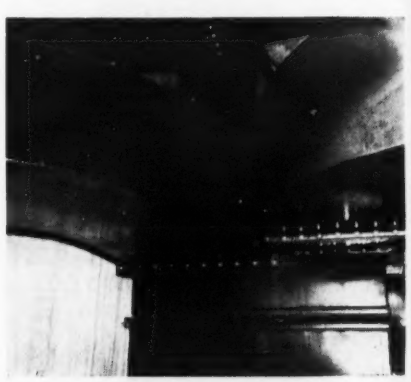
Economical solution to corrosion problems has been found at Courtaulds, where a complete system has been set up with dip tank and baking oven so that —

plant applies own PVC plastisol linings

GORDON WEYERMULLER, Associate Editor
With **DAVID RODGER,** Plant Engineer
Courtaulds (Alabama) Inc., Le Moyne, Alabama

Problem: At the Courtaulds viscose rayon plant north of Mobile, Alabama, problem was faced of protecting interior surface of processing vessels and pipe from sulfuric acid handled in varying strengths at temperatures up to 200°F. Also exterior of pipes, tanks, and other equipment had to be protected from sulfuric fumes as well as H_2S and CS_2 gases at 120-130°F.

Solution: Instead of the obvious answer of buying all pipes, ducts, and other equip-



Large spinbath exhaust ducts at Courtaulds are protected by 1/8"-thick PVC coating, which was applied in the plant by dipping the parts in the plastic and then fused by baking

ment made of corrosion-resistant plastics or alloys or lined with these materials on the inside and outside, Courtaulds adopted a plan considered to be more economical. Equipment was installed for applying polyvinyl chloride plastisol coatings and baking them right at the plant. Equipment consists of a large dip tank, a large indirect-fired gas oven, a hoist, plus other miscellaneous equipment.

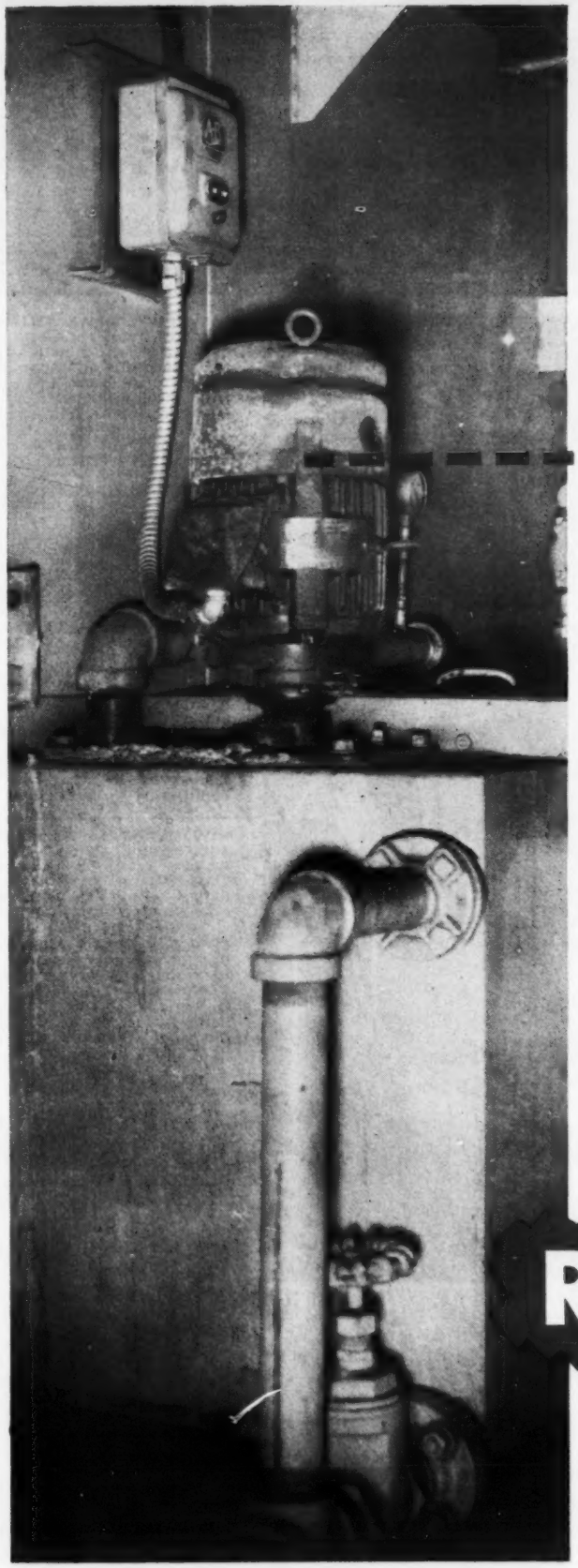
Metal to be coated is first sandblasted, then primed with No. 101 heat-reactive finish by spray or brush. Metal part is then preheated in oven to a designated temperature, which depends on thickness of metal and thickness of coating to be applied. Plastic coating is usually from 3/32" to ⅛" thick.

After preheating, metal part is dipped in the tank containing the liquid PVC for a designated period of time. In next step, part is drained, then placed in the oven for fusion of the plastisol to the metal. After part is cooled, film is inspected visually. Film can also be checked by spark testing.

Results: Method of applying own PVC linings has worked quite successfully at Courtaulds for protecting pipes, ducts, vessels, and other equipment from corrosion. Although one might wonder if one plant of about 800 employes could justify the capital expenditure for a large baking oven, dip tank, and other equipment, the method has saved the plant considerable money. Also, the plant doesn't have to worry about delivery dates.

(In-plant plastisol system and PVC coatings are product of Quelcor, Incorporated, Dept. CP, Front and Broomall St., Chester, Pa. . . . or for more information about system check 4457 on form which is located opposite last page.)

(Plastisols are based on Exon resins, these resins being a product of Firestone Plastics Co., Div. of Firestone Tire & Rubber Co., Dept. CP, Pottstown, Pa. . . . or for more information on manufacturer's product check 4458 on form which is located opposite last page.)



RELIANCE solves motor corrosion problem

This Reliance Corrosion-Proof Motor is operating a pump which circulates cleaning solution through a tank containing metal parts. The motor is subjected to corrosive vapors and liquids each time a basket of parts is removed. BUT THIS MOTOR WILL NOT CORRODE.

The solid cast-iron housing, including the fan cover, will withstand corrosive service indefinitely. Wiring identification is preserved on a stainless steel name plate. A threaded outlet is provided on the water tight conduit box, and motor leads are molded into a neoprene gasket that completely seals off the windings from the conduit box. A neoprene or non-ferrous shaft slinger seals the only other frame opening.

These and many other features give you a motor with a built-in corrosion protection. Why not install this superior design now and save many replacement dollars in the years ahead.

Write for bulletin B-2406 for complete design details.

B-1334

R

RELIANCE ELECTRIC AND ENGINEERING CO.

DEPT. 147A, CLEVELAND 17, OHIO
CANADIAN DIVISION: WELLAND, ONTARIO
Sales Offices and Distributors in Principal Cities

When inquiring check 4459 opposite last page

In-line corrosion testing to pick right material for valves

Corrosion service built around in-plant corrosion test rod installation and evaluation is now being offered. Service works on basis of specially built corrosion test rods holding samples of various materials of construction under consideration for valves. Rod is installed in solution line and a record kept of exposure time. A period of 60 days is usually adequate for a test.

After exposure, rod is returned to supplier where samples are cleaned, weighed, and examined in detail. Corrosion

Corrosion test rods help determine best materials for handling particular fluid

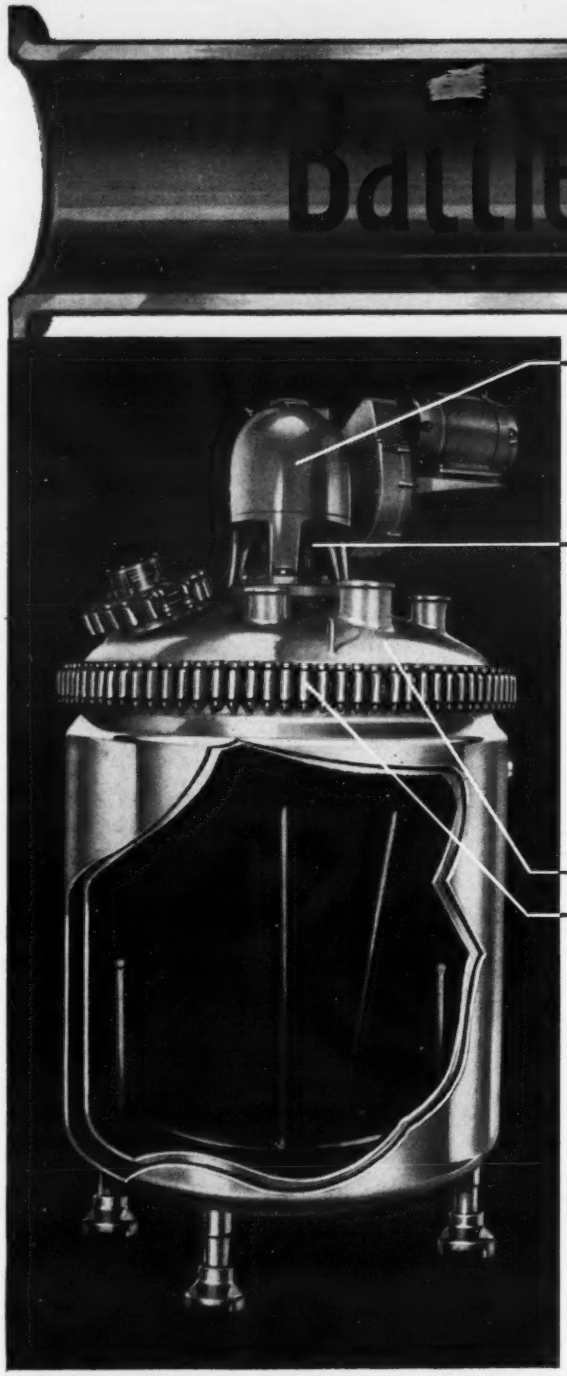
rates are computed and recommendations made as to best material selection for valves and other components.

Rods can be installed in operating plant lines 2" in diameter or larger. Samples are insulated from rod by Teflon washers and fastened with corrosion-resisting bolts.

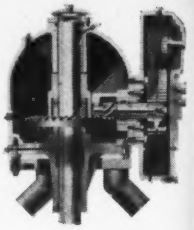
(Corrosion test rod service is supplied by Alloy Steel Products Co., Inc., Dept. CP, Linden, N. J. . . . or for more information check 4460 on form last page.)

Titanium pipe data

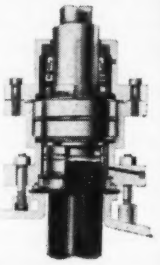
Seamless metal pipe and tube of titanium for use in severe corrosive environments is subject of 12-page folder. Folder TDC-185 — Tubular Products Div., The Babcock & Wilcox Company, Dept. CP, Beaver Falls, Pa. Check 4461.



HEAVY-DUTY DRIVE ASSEMBLY — Smooth, efficient, quiet running. Two drive reductions transmit ample power for all agitator needs and speeds. Tapered and radial roller bearings assure friction-free, straddle-mounting for pinion shaft. Heavy-duty gears, bearings and shafting — also available with gear head and variable speed motors. Protected by full-bath lubrication.

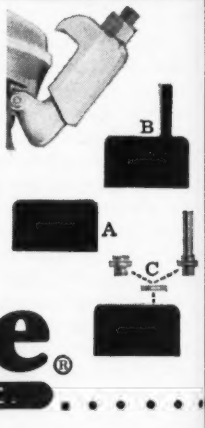


EXCLUSIVE ROTARY MECHANICAL SEAL — Superior for high-pressure or vacuum processing. (1) Eliminates leakage under pressure (toxic or explosive conditions) and reduces maintenance. (2) Permits efficient use of higher operating pressures . . . prevents metallic and catalytic contamination of vessel contents. Outstanding features: pre-loaded, double-tapered roller bearing, glass-coated gland insert, glass-coated agitator shaft and Teflon packing.



EXTRA-DEEP STUFFING BOX (not shown) is supplied as standard equipment. Exclusive design of 2-piece lantern ring minimizes maintenance. Glass-coated or alloy-packing plate fits tightly around agitator shaft. Latest packing materials and shrink-fit alloy sleeve for severe conditions are available.

NEW SWING CLAMPS ASSURE EVEN PRESSURE on both flanges — can't twist sideways . . . minimize danger of cracking glass. Clamp positions permanently on flange — can't be lost. Saves considerable time on process changeover.



CHOICE OF THREE BAFFLES—with restricted tips for handling great number of viscosities, specific gravities and particle sizes. (A) Spade-type baffle (B) Glass-lined tip which is an integral part of the baffle itself. (C) Removable alloy plug receives alloy tip whenever need arises.

Glascote®

PRODUCTS, INC.

CLEVELAND 17, OHIO

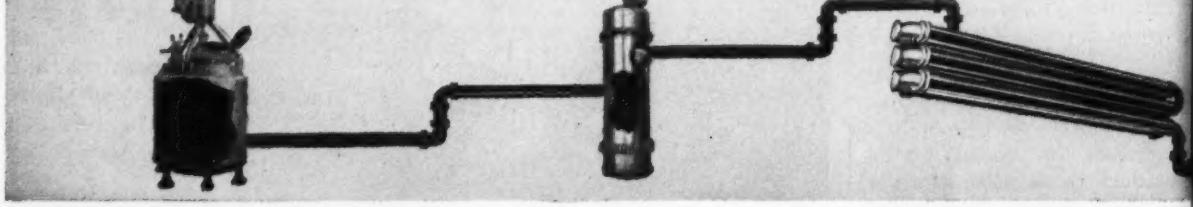
Sales offices or agents located in New York • Philadelphia • Union, N. J. • Chicago • Cleveland • Dayton • Houston • Los Angeles.

Export Sales: A. O. Smith Corp., International Div., Milwaukee 1, Wis.

GLASS-LINED REACTORS — Three types: HR, CR and SR. Custom-built up to 8,000 gallons. Standard units from stock range from 300 to 2000-gallon capacities.

GLASS-LINED COLUMNS — Standard and special packed units in glass-on steel or alloy metals. Built to your specifications in diameters up to 60 in.

GLASS-LINED HEAT EXCHANGER TUBES. Easily assembled into corrosion-resistant heat exchangers. Standard-diameter jacketed pipe, combines with elbows or return bends.



Looks hard to manufacture, but Glascote skill makes it easy!

Superior knowledge of combining glass and steel qualifies Glascote to find quick, easy solutions to many process problems. This top head is typical. All told, there are nineteen 4-inch inlets. The manhole measures 24 inches in diameter.

Custom and standard reactors

Glascote reactors include designs in the HR (heavy-duty closed), CR (clamp-top) and SR (standard closed) series. Custom-built reactors available in capacities up to 8000 gallons dependent on design pressures. Standard units available from stock in a range from 300 to 2000 gallon capacities. ASME constructed.

Glascote®
glass-lined products

Stop corrosive attacks . . . help you increase yield thru zero contamination

Make Glascote chemical-resistant, acid-alkali glass *your first line of offense against corrosion and contamination.* An inventory of more than 3,000 glass formulas developed by Glascote and its parent organization, A. O. Smith Corporation, gives you the best in corrosion resistance and eliminates danger of metallic contamination.

Glascote offers you reactors, columns, storage tanks, rotary dryer-blenders, pipe and fittings — *all glass-lined* for processing a variety of corrosive materials with start-to-finish application versatility.

Glascote also offers you non-stick glass which is ideal for polymer production of all types.

Glascote clamp-top reactor, left, is typical of many products supplied for laboratory, pilot plant and full-scale commercial production, engineered and fabricated by Glascote to your exacting specifications.

Ask the representative who calls on you for all the facts about Glascote products — reactors, storage tanks, columns, conical rotary dryer-blenders, receivers, condensers and accessory products. Or, if you prefer, write direct. Glascote Products, Inc., Cleveland 17, a subsidiary of A. O. Smith Corporation.

Our standard one-year guarantee continues to apply to all Glascote glass-lined products.

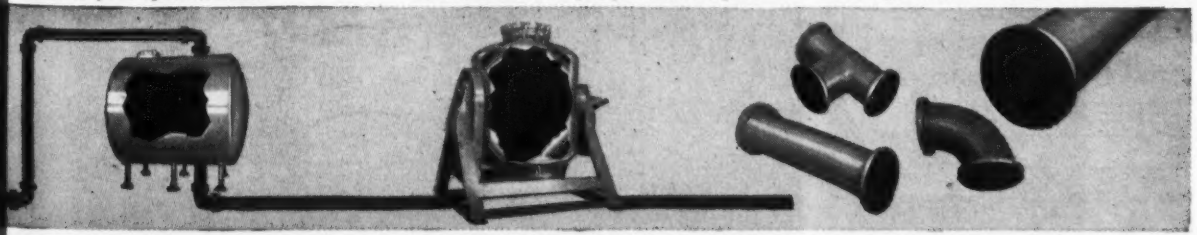
A subsidiary of A.O.Smith Corporation

World's largest manufacturer of glass-lined steel products

GLASS-LINED STORAGE TANKS — Single shell horizontal types and vertical units available. Plain, jacketed, open and closed. Built to your specifications.

GLASS-LINED CONICAL, ROTARY DRYER-BLENDERS — Capacities 5, 35 and 110 cu. ft. as standard and larger on request. Pressures: tank full vacuum to 25 psi, jacket 65-75 psi.

GLASS-LINED PIPE AND FITTINGS—Available in 10-ft. lengths, fittings to ASME standards, in inside diameters from 1½ to 4 in. Six and eight inch and larger sizes to order.



When inquiring check 4462 opposite last page

Zinc-rich coatings have improved adhesion

Furnish six-mil thickness in one coat

Uses: Most popular uses are for brine and sea water immersion, and for brine conditions where hydrogen sulfide is present. Coatings can also be used in other industrial applications, being particularly useful in marine atmospheres.

Features: In formulating the coatings, company was able to increase the binder strength by lowering the zinc content. Six mils thickness is obtained per coat.

Description: Three different types of zinc-rich coatings are available, choice depending on application. Coatings can be applied over power-brushed rusty steel for service other than tank linings. Heretofore, a sandblasted surface was needed for all applications.

(XR-150 zinc-rich coatings are products of Carboline Co., Div. of Mullins Non-Ferrous Castings Corp., Dept. CP, 331 Thornton Ave., St. Louis 19, Mo. . . . or for more information check 4463 on form opposite last page.)

"Hope you and Larry finished the taping job without arguments."

Thanks to an idea submitted by Dale S. Glass, National Carbon Co., A Division of Union Carbide Corp., Cleveland, Ohio

CORROSION RESISTANT

MACWHYTE
PREformed WIRE ROPE

- STAINLESS STEEL
- MONEL METAL
- PLASTIC COATED

Wherever wire rope is exposed to: Alkaline condition, oxidizing acids, neutral brines, foods, aromatic chemicals, and marine atmosphere, there is a Macwhyte Wire Rope available.

Macwhyte corrosion resistant Wire Rope is made in a wide range of sizes, types, flexibility and strength to meet the most exacting requirements.

All types of Macwhyte cable are in stock from our mill depots from coast to coast. Recommendations and prices will be given upon request.

1126

SEND FOR FREE BULLETIN 4930

MACWHYTE COMPANY
2906 Fourteenth Avenue
Kenosha, Wisconsin

My cable uses are .....
Name .....
Title .....
Company .....
Address .....
City ..... *State* .....

When inquiring check 4464 opposite last page

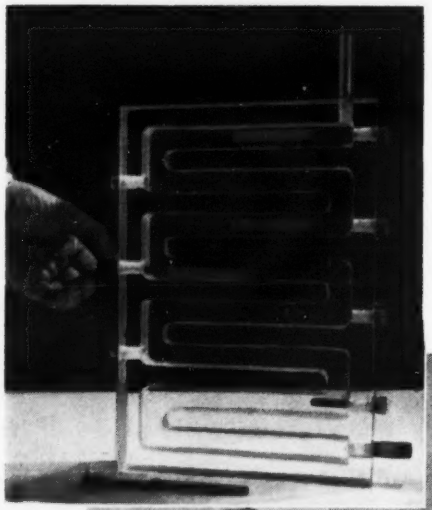
Versatility and Visibility *furnished by* corrosion testing apparatus

DR. J. I. BREGMAN,
And T. R. NEWMAN, Chemist,
Physical Chemistry Laboratory Head
Physical Chemistry and Corrosion Laboratories
National Aluminate Corporation, Chicago, Illinois
With GORDON WEYERMULLER, Associate Editor

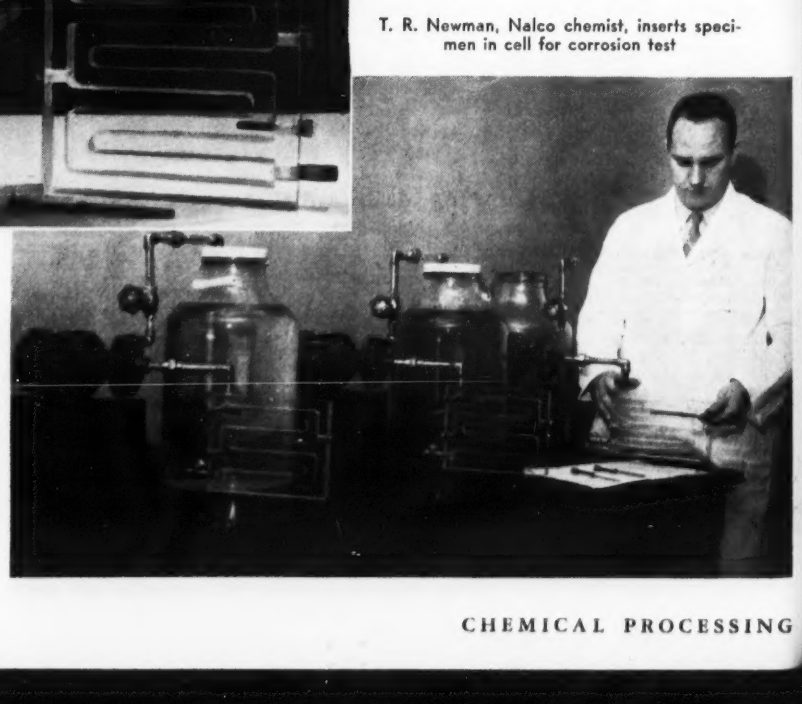
Visitors to the corrosion section of National Aluminate Corporation's laboratories have expressed considerable interest in corrosion testing apparatus recently placed in use. Coupons can easily be inserted or removed — yet can be observed while the system is in operation. Corrosion can be tested in the equipment under varying flow conditions.

Apparatus is used in the development and study of corrosion inhibitors for cooling towers and for processing water. Non-aqueous inhibitors for use with refinery overheads and inhibitors for liquid fertilizers are also studied.

Corrosion testing equipment was designed and made at the Nalco plant. Transparent piping for test cells was cut out of Lucite blocks in the plant machine shop. Type 304 stainless pipe of ½" diameter was used for transporting the



Coupon can be easily inserted or removed from cell — can be observed while test is proceeding



T. R. Newman, Nalco chemist, inserts specimen in cell for corrosion test

corrosive solutions to and from the transparent test cells.

Gate valves used in apparatus are Fig. 1300, ½" units made of 316 stainless. They have non-rising spindle, screw-in bonnet, and solid wedge.

Small centrifugal pumps used are Model D-11 units, with 304 stainless construction and rotary seals. This pump is one of the smallest available close-coupled, single-stage centrifugal units with an induction motor. Its light weight, compact design, and continuous-duty motor make the pump desirable for installation in laboratory and pilot plant equipment.

Corrosion testing equipment was designed by T. R. Newman, Chemist, and brought into reality by Landreth Hartley, Machine Shop Superintendent.

(A detailed drawing and data on construction costs of this test apparatus are available on request. Write National Aluminate Corporation, 6294 W. 66th Place, Chicago 38, Ill.)

(Fig. 1300 gate valves are product of Jenkins Bros., Dept. CP, 100 Park Ave., New York 17, New York . . . or check 4465 on form opposite last page.)

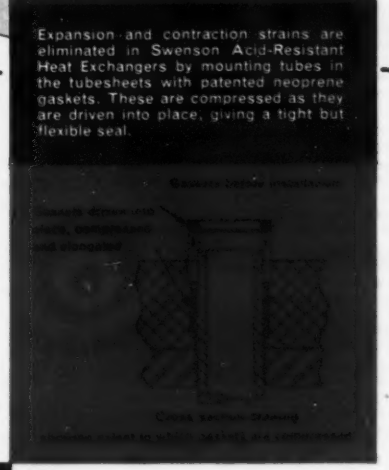
(Model D-11 centrifugal pumps are product of Eastern Industries, Inc., Dept. CP, 100 Skiff St., Hamden, Conn. . . . or check 4466 on form opposite last page.)

Case history on tantalum at Diamond Alkali

Bulletin of four pages, containing information on the solution of corrosion problems, features case history of tantalum condenser installation at Diamond Alkali Company, Painesville, Ohio. Along with other articles on uses of tantalum, bulletin also contains capacity chart for tantalum heat transfer equipment. "Corrosionomics" — Chemical Equipment Division, Fansteel Metallurgical Corporation, Dept. CP, North Chicago, Ill. Check 4467.

Get this new booklet

Expansion and contraction strains are eliminated in Swenson Acid-Resistant Heat Exchangers by mounting tubes in the tubesheets with patented neoprene gaskets. These are compressed as they are driven into place, giving a tight but flexible seal.



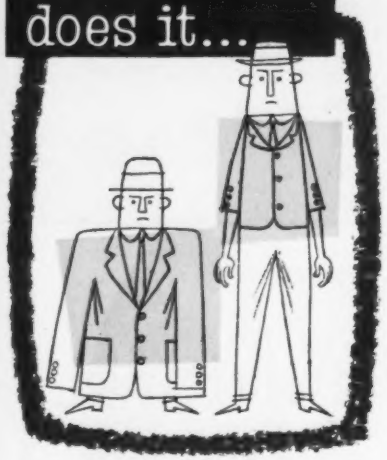
Read about Swenson Acid-Resistant Heat Exchangers that are custom designed for your liquor heating application. Get a copy of Swenson's new folder and see the many alternate Swenson designs available in various corrosion resistant materials. See the outstanding design features, performance charts and typical cross section drawings contained in this fact-filled booklet. Write today for your copy . . . ask for Bulletin SW-200.

SWENSON EVAPORATOR COMPANY
15667 *Lathrop Avenue, Harvey, Illinois*

SWENSON
Proved Engineering for the Process Industries
Since 1889
A Division of WHITING Corporation

When inquiring check 4468 opposite last page

no one coat does it...



one source does

Valdura offers maintenance paints made from specific resins for every condition

EPON

VAL-CHEM. Versatile, chemical resistant metal primer for use under any finish coat. VALPON ENAMEL. Prevents damage by oils, solvents, alkalies and other chemicals on wood, metal or masonry.

PARLON

PARAVAL ENAMEL. Not affected by acids, alkalies and other chemicals. Used on wood, metal, concrete or masonry. RUBBER BASE ENAMEL. Combines excellent exterior durability with high chemical resistance.

BAKELITE

SUPER SERVICE ENAMEL. Resists chemical, moisture and abrasive conditions on metal wood or masonry. ASPHALT ALUMINUM PAINT. 98% waterproof metal coat prevents rust, rot, corrosion. Highest reflectivity.

COAL TAR

SEWAGE DISPOSAL BLACKS. Used for protecting concrete and metal surfaces from water, etc., found in sewage plants, reclamation projects, refrigeration systems, metal and concrete pipe, marine exposures.

URETHANE

URAVAL. The very latest type of coating that combines the ultimate in resistance to chemicals, solvents, marring and abrasion. Uraval will stand up where all other types of coating have failed.

ALKYD

M & F ENAMEL (General Maintenance), VALKOTE (Implement Enamel), DARYWHITE. Products that utilize the outstanding durability of alkyd resins. All these coatings are hard, tough, quick drying and color retentive.

Write today on your regular letterhead for FREE catalog on all Valdura maintenance paints.

VALDURA PAINTS THAT ENDURE

VALDURA
HEAVY DUTY
PAINT DIVISION
AMERICAN-MARIETTA CO.
101 E. Ontario St., Chicago 11, Ill.
687 Wellington St., Ottawa, Canada

When inquiring check 4469 opposite last page

Stainless Y valve has renewable Teflon disc

Valve available in same schedule as pipe

An all-fabricated stainless steel Y valve with renewable Teflon disc has recently been made available. Teflon disc is extremely effective for abrasive fluids, hard-to-hold liquids, and for vacuum service. Valve has the straight-through flow of a gate valve and yet has the seating qualities of a globe valve.

For abrasive fluids, hard-to-hold liquids, and vacuum service

Valves are being offered in the same schedule as the piping used with them. For example, schedule 10 valves are available for schedule 10 pipe — schedule 40 valves for schedule 40 pipe.

(No. 299 Y valve is product of Star Tank and Filter Corp., Dept. CP, 875 Edgewater Rd., New York 59, N.Y. . . . or for more information check 4470 on form opposite last page.)

Reinforced Teflon resists fuming nitric acid, liquid oxygen

Tested at temp up to 165°F for up to seven days

A recent series of tests has shown that two commercially available aluminum-silicate fiber reinforced Teflon® products resist attack by fuming nitric acid and liquid oxygen at temperatures up to 165°F.

now! greater ***safety*** *and* ***efficiency*** *in*

PUMPING CORROSIVE FLUIDS

BART
FLEX-SEAL
CENTRIFUGAL PUMPS

At last—a full line of pumps *specifically designed* to handle corrosive and abrasive fluids in the 1 to 80 GPM range, at heads to 75 feet.

No longer need you cut down bigger pumps in range and lose efficiency—or put up with undependable smaller pumps.

Bart pumps have fewer parts to wear or get out of order. Six models, each in two materials . . . Type 20 Stainless Steel or Hastelloy C . . . cover almost every application.

Write for catalog and performance curves.

Heart of the BART . . . the exclusive Flex-Seal!

Effectively minimizes a long-prevalent basic weakness of centrifugal pump design. Self-adjusting to wear. Needs no external lubrication. Carbon stator/ceramic seat, unexcelled for long wear—or zircon filled Teflon/work-hardened Type 20 Stainless Steel, for severest corrosive service.

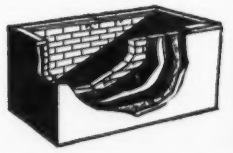
BART MANUFACTURING CORP.
ELECTROFORMING · PIPE LINING & COATING · PLATERS · PUMPS · ENGINEERING DESIGN SERVICES
229 Main St., Belleville 9, New Jersey

When inquiring check 4471 opposite last page

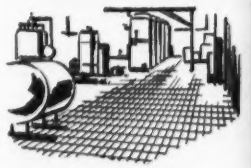
for COMPLETE CORROSION

Protection . . .

SPECIFY ATLAS

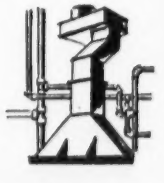


all types of chemical processing and storage tanks as well as other vessels for handling or holding corrosive solutions can be protected with Atlas Corrosion-Proof materials of construction.



industrial floors, pits, trenches and sumps can be constructed to resist attack from corrosive spillage and drainage of a wide range of acids, alkalies, solvents, salts, greases and detergents.

corrosion-resistant, self-supporting, plastic structures can be designed and fabricated to meet your specific needs . . . complete plastic pipe systems including flanges, valves and fittings are also available.



ATLAS MINERAL
MERTZTOWN, PENNSYLVANIA

Write for Bulletin CC-3 giving complete facts.

When inquiring check 4472 opposite last page

TEFLON®

Laminated

DIP PIPE

☆ *Won't break!*
☆ *Withstands 500°F!*
☆ *Corrosion-proof!*

Here are non-contaminating dip pipes and spargers constructed for freedom from trouble. Fluoroflex®-T pipe has laminations of glass fibre impregnated with Teflon. The one adds strength and rigidity and the other complete inertness to hot, highly corrosive chemicals.

In one test case, Fluoroflex-T dip pipe was immersed in 50% hydrofluoric acid for 150 days without any visible effect. Such performance is typical.

Best of all, this inert pipe is fracture-proof...eliminating the problem encountered with ceramics or glass. Available standard in 2" I.D.; special sizes to 6". Send for Bulletin FTL-2.

Reinforced Teflon was developed to overcome cold flow and heat distortion experienced with pure Teflon. It has successfully served as a gasketing material at 700°F under a torque of 35 lb and a flange pressure of 1000 psi (CHEMICAL PROCESSING, January, 1956.)

Tests were conducted as follows: Samples were exposed to fuming nitric acid at ambient temperature for 450 hr; other samples at 150 to 160°F for 142 hr. Further tests were made in fuming nitric acid, containing a small amount of hydrofluoric acid, at 150 to 165°F for 166 hr, and at 80°F for 48 hr. Separate test was run by exposing samples to oxygen gas at 2000 psig and 160°F for seven days.

In all cases material showed excellent resistance to attack. There was no delamination, swelling, or dimension changes. An attempt to "peel" or "flake" the samples showed that material was still strong and durable.

Reinforced Teflon also was subjected to impact loading in liquid oxygen to determine maximum safe loading conditions. Material withstood 59.2 ft-lb, which was limit of testing machine. These results were comparable to those obtained with pure Teflon and Kel-F.

(Duroid 5600 and 5650 reinforced Teflons are products of Rogers Corporation, Dept. CP, Rogers, Conn. . . . or for more information check 4474 which is located on form opposite last page.)

Zirconium bibliography

Sources of information pertaining to applications and mechanical, physical, electrical, chemical, and nuclear properties of zirconium and its alloys are presented in 7-page bibliography. Tabulation is believed to contain all major books, pamphlets, and articles published since 1950. Zirconium Bibliography — Columbia-National Corporation, Dept. CP, 70 Memorial Dr., Cambridge 42, Mass. Check 4475.

MOLDED *reinforced* TEFLON® Bellows

Fluoroflex®-T corrosion-proof bellows are *molded* (instead of machined from the solid), preserving natural grain flow and thereby gaining remarkable fatigue-life. Their spiral convolution permits use of a reinforcing wire. The result is extremely durable bellows for use in anti-corrosive piping systems to absorb vibration, as an expansion joint, or to correct for misalignments.

TYPICAL CASE HISTORY: One of the country's best known companies tested a Fluoroflex-T 3" x 12" bellows assembly which had one end fixed and the other axially displaced ¾-inch. It was rotated at 1000 rpm for 20 million cycles. No failure! Test discontinued.

Bellows are furnished complete with ASA Standard flanges for connecting to existing piping; and are also fabricated to meet special installation and operational requirements. Send for details.

Stress-relieved

TEFLON STOCK

Fluoroflex-T rods, sheets and tubes are stress-relieved to provide dimensional stability in parts machined from them. Available from stock in a wide range of sizes. Contact us on your needs for the Teflon recognized as tops in quality.

® Teflon: DuPont trademark.
Fluoroflex: Resistoflex trademark.

RESISTOFLEX
CORPORATION
ROSELAND, N. J. • WESTERN PLANT: BURBANK, CALIF.
SOUTHWESTERN PLANT: DALLAS, TEX.

When inquiring check 4473 opposite last page

Dimensionally stable

TEFLON STOCK

Fluoroflex-T rods, sheets and tubes are stress-relieved to provide dimensional stability in parts machined from them. Available from stock in a wide range of sizes. Contact us on your needs for the Teflon recognized as tops in quality.

® Teflon: DuPont trademark.
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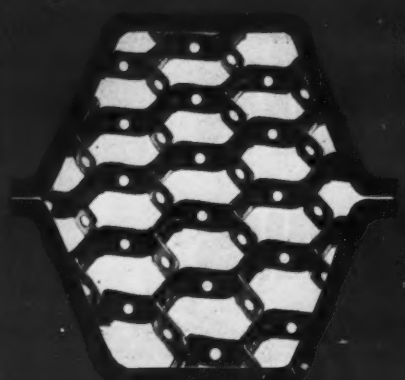
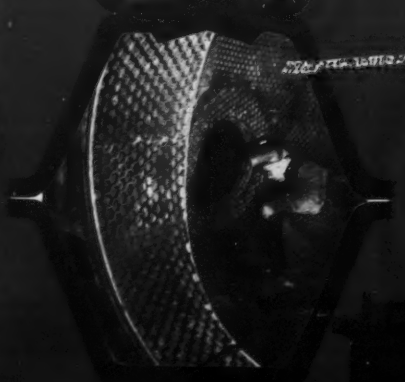
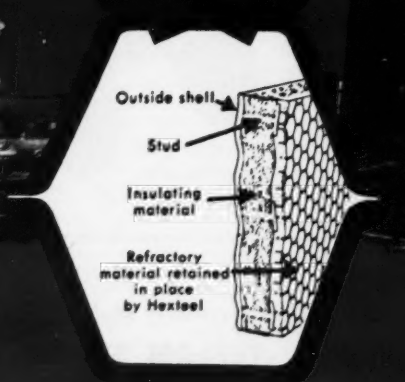
KLEMP HEXTEEL

will prolong the life of this cat cracker!







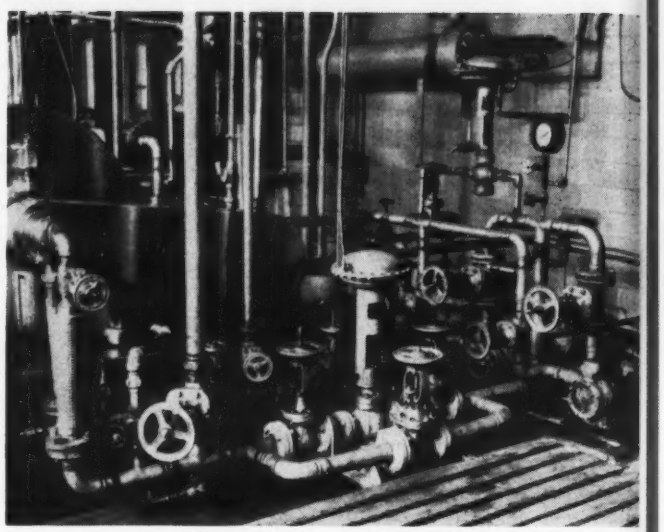
Photographs taken at Anderson-Prichard Oil Corp. installation at Cyril, Oklahoma

RETARDS ABRASIVE AND CORROSIVE ACTION

We Tread the World with Safety

KLEMP METAL GRATING CORPORATION
6643 SOUTH MELVINA AVENUE
CHICAGO 38, ILLINOIS
PORtsmouth 7-6760

When inquiring check 4477 opposite last page



Welding fittings assure rigid, leak-proof system for solvents at Wyeth. Insert flanges permit flexibility

Because hard-to-hold solvent required greater than normal joint tightness, Wyeth chose welding fittings for a . . .

leak-proof piping system that saves 50% on costs

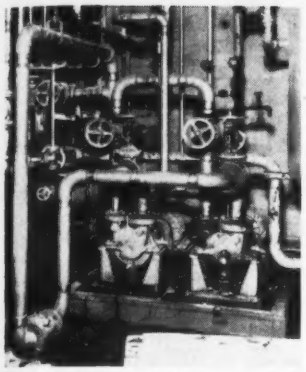
THEODORE W. WETT, Assistant Editor
With **C. A. HEISTERKAMP,**
Chief Engineer
Wyeth Laboratories Inc.
West Chester, Pennsylvania

Usually hard-to-hold acetone-alcohol mixture has been tamed by stainless steel welding fittings and insert flanges at Wyeth Laboratories Inc., West Chester, Pa. Mixture, used as a solvent for penicillin, and penicillin broth, requires greater than normal tightness in joints and couplings or leaks occur. Piping system is made of stainless steel to withstand corrosion.

Welding fittings not only provide leak-tight connections but because they allow use of schedule 10 stainless pipe rather than schedule 40, costs are lowered almost 50%. Flexibility is achieved by use of insert flanges.

Installing piping system for fermentation process and solvent recovery system required complete range of fittings. Tees, elbows, flanges, aligning connectors, reducers, and unions were used.

For threaded connections wall thickness of pipe is reduced by approximately 50% in threading. In order to assure sufficient strength at thread, pipe thickness must be greater than necessary throughout main portion of system. If leakage occurs at



Use of schedule 10 pipe, possible with fittings, saves almost 50% in piping cost

joints back-welding is required. Frequently this means a complete shutdown.

With fittings welded there is no possibility of leaks. Piping system at Wyeth has required a minimum of maintenance since installation in 1952. Safety factor is greater since entire wall thickness of pipe is utilized throughout each length. Connections can be made quickly and a rigid, leak-proof system results.

Flexibility for future expansion and changes is possible with use of insert flanges. Either pipe or fittings is expanded into flange where a serrated ferrule secures end permanently and rigidly.

Extra length of straight section on ends of fittings permits welding with ease. Danger of insecure weld is reduced and installation time decreased because welder has more "elbow room."

(Speedline welding fittings and insert flanges are products of Horace T. Potts Co., Dept. CP, Erie Ave. & D St., Philadelphia 34, Pa. . . . or for more information check 4478 on form opposite last page.)

Corrosion-resistant pump

Installation and operation of company's line of heavy-duty chemical pumps for corrosive service are detailed in eight-page bulletin. Bul P/9a — The Duriron Company, Inc., Dept. CP, Dayton 1, Ohio. Check 4479.

ZR

CORROSION RATE
Less than .0002 inches per year in *boiling, concentrated* hydrochloric acid.

World's First Commercial Zirconium Heat Exchanger—another "first" with ZIRCONIUM by The CARBORUNDUM METALS Company. Heat Exchanger manufactured by Pfaudler Company.

Now...
corrosion resistance to both acids and caustics...with

ZIRCONIUM

CORROSION VERSATILITY—the ability of ZIRCONIUM to resist both strong acids and caustics, such as molten sodium—provides completely new concepts in chemical processing equipment. ZIRCONIUM heat exchangers, for example, permit the cooling of strong mineral acids on the tube side, using strong alkalines for coolants on the shell side, or vice versa. Corrosion versatility also means savings with equipment that is interchangeable. Basic equipment components, made of ZIRCONIUM, such as reaction tanks, valves, filter presses and pumps, can now be interchanged for service in either strong acids or alkalis.

For further information on the many service savings and benefits of ZIRCONIUM chemical processing equipment, write to The CARBORUNDUM METALS Company. Ask to be placed on the mailing list of "More ZR Facts", the ZIRCONIUM Industry's first continuing source of technical information.

The CARBORUNDUM METALS Company
Akron, New York
Division of THE CARBORUNDUM COMPANY

Production Pioneer of ZIRCONIUM

When inquiring check 4480 opposite last page

For some applications ONLY CHEMICAL CERAMICS *will do*

For only chemical ceramics will resist all acids, alkalies and all solvents (with the exceptions of hydrofluoric acid and hot caustics). White chemical porcelain, in particular, offers important processing advantages. In addition to its chemical inertness, white chemical porcelain is completely non-toxic and non-contaminating. Its smooth glazed surface makes cleaning a matter of minutes. It can be fabricated in one-piece construction into vessels of practically any shape and in sizes from a thimble to a thousand gallon tank. Many items of equipment, such as pipe, valves, fittings, sinks, filters and storage vessels are standard items carried in stock and ready for immediate shipment. Other items can be fabricated on short notice.

The United States Stoneware Company has been one of the world's principal producers of chemical ceramics for more than ninety years. Continual research and improved manufacturing techniques give today's chemical ceramics characteristics far superior to those of even a few years ago: better heat-shock resistance, higher mechanical strength, closer dimensional tolerances.

Better take a fresh look at chemical ceramics. It may pay you well. *Write today for Bulletin C-5.*

PRODUCT OF U.S. STONEWARE

PROCESS EQUIPMENT DIVISION

499-D

Other Corrosion-Resistant materials manufactured and fabricated by U. S. Stoneware and its affiliated companies, include: TYGON Plastics, Duralon Resins, natural and synthetic rubber products, lead-lined equipment, adhesives and organic bonding agents, acid-brick and cements, and sintered metallic oxides.

When inquiring check 4481 opposite last page

Controls corrosion, and kills bacteria in CO_2-O_2 systems

Uses: Chemical material is effective corrosion inhibitor and bactericide in systems where carbon dioxide, oxygen corrosion are a problem. It has been used to some extent in secondary oil recovery operations, "sulfate reducers" and water cooling systems.

Features: At strengths of 10 to 25 ppm, product provides complete bacteria control and 95% corrosion protection in "sulfate reducers." A West Texas flood uses 15 ppm to obtain 80% corrosion inhibition in a system containing 8 ppm dissolved oxygen.

Description: Material is distilled coco aliphatic diamine adipate salt, 50% active. It is clear straw in color, completely soluble in water and will pour at 0°F.

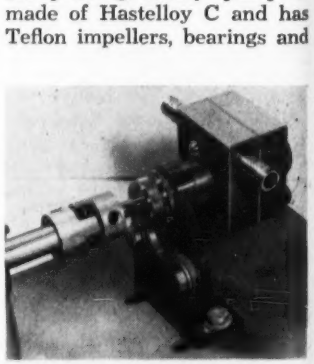
(Doumeen CDA-50 is manufactured by Armour & Co., Chemical Division, Dept. CP, 1355 W. 31st St., Chicago 9, Ill. . . . or for more information check 4482 on form opposite last page.)

Rotary pump handles corrosive liquids in lab, pilot plant

Made of Hastelloy C with Teflon parts

Uses: Pumping corrosive liquids in laboratory and pilot plant installations.

Features: Low capacity, self-priming rotary pump is made of Hastelloy C and has Teflon impellers, bearings and



Hastelloy C, Teflon rotary pump handles capacities to 2 gpm

Do You Have A Deburring Headache?

GET THE FACTS ABOUT

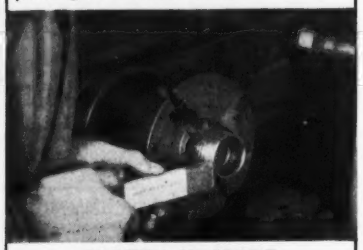
CRATEX
RUBBERIZED ABRASIVES

"The World's Best For Industrial Use"

Exceptionally superior and unparalleled for:

DEBURRING, SMOOTHING, CLEANING and POLISHING operations after dimensional shaping

For removing rust, heat-marks, tarnish, fatigue lines, scratches, excess solder, corrosion and other surface defects: for blending-in polishing welded seams, final sharpening and polishing to lustre-like finish.



CRATEX IS MADE IN FOUR DIFFERENT GRITS

Coarse Grit to Extra Fine in

WHEELS · POINTS · BLOCKS STICKS · CONES

For Machine or Manual Application on the broadest range of

Hard and Soft METALS and other Materials

Backed by over 30 years industrial, professional and technical application, CRATEX Rubberized Abrasives are widely used nationally and in foreign countries. Made from "premium quality chemical rubber bonds" pressure-molded into uniform textures without hard or soft spots—resilient to absorb shock—ready for instant use—offer uniform controlled "cushioned action" with ease of manipulation for dimensional accuracy, without loss of tolerances.

OPERATE SAFELY, EFFECTIVELY AT SPEEDS UP TO 5,500 S.F.P.M.

Send for comprehensive illustrated catalog—learn how CRATEX Rubberized Abrasives can cut your costs, speed production and insure quality results. Sold at leading industrial supply dealers.

CRATEX MANUFACTURING CO.
81 Natoma St., San Francisco 5, Calif.

When inquiring check 4484 opposite last page

packing. Flow is linear for constant-flow metering. Pump is reversible and may be staged for higher pressures.

Description: Operatable at 1750 rpm within temperature range of −200°F to 300°F, pump handles capacities to 2 gpm and pressures to 50 psi.

Measurements are 4″ wide, 6″ long and 4″ high. Port connections (⅜″) may be threaded or corrugated for hose and clamp connections.

(HCT All-Chem rotary pump is manufactured by Eco Engineering Co., Dept. CP, 12 New York Ave., Newark 1, N.J. . . . or check 4485 on form opposite last page.)

High-build vinyl saves material and labor

Recently developed vinyl coating is formulated with specially matched resins and pigments that permit exceptionally high solids content without excessive viscosity. Coating requires fewer gallons and fewer coats, with savings of up to 47 percent in material and labor.

When applied at 250 sq ft per gallon over a suitable primer, only two coats of the vinyl are required to exceed five mils film thickness. Corrosion resistance of coating is excellent to acids, alkalis, salts, sulfides, alcohols, and a variety of other materials. It can be easily applied by conventional or hot spray.

(No. 33HB vinyl coating is product of Amercoat Corporation, Dept. CP, 4809 Firestone Blvd., South Gate, Calif. . . . or for more information check 4486 opposite last page.)

Titanium wire cloth

Advantages, uses and specifications of wire cloth woven of titanium are briefly summarized in two-page bulletin. "Titanium Wire Cloth" — The Cambridge Wire Cloth Co., Dept. CP, Cambridge, Md. Check 4487.

YOU GET MAXIMUM VALUE WHEN YOU SPECIFY

CAMCO

CORROSION RESISTANT FLANGES & FITTINGS

SPECIALIZATION in the manufacture of stainless steel pipe fittings has resulted in a quality product at no premium in price.

- **SCREWED**
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One source for all your Stainless Steel Fitting Requirements

FILL IN AND MAIL TODAY FREE!

CAMCO Products, Inc., 445 State Street
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Gentlemen: Please Send —

- ☐ Catalog covering complete line
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CAMCO PRODUCTS, INC.

445 STATE STREET
NORTH HAVEN, CONN.

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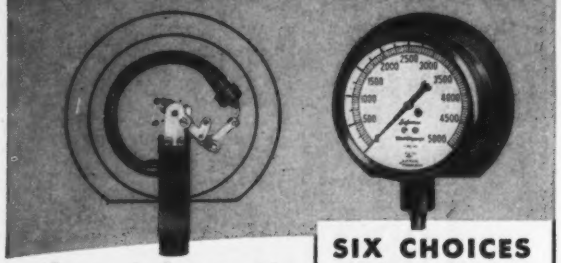
STAINLESS!



—from inlet to tip

Now the superlative Mastergauge is available in a wider range of corrosion resistant tubes and sockets than any other pressure gauge.

Check the adjoining list. And remember that tube socket and tip are fused into one piece by the exclusive Marsh "Conoweld" process.

Marsh alone combines the "Conoweld" construction, the copper-clad "Marshalloy" case, the finer Mastergauge movement, the Marsh "Recalibrator", the new "Safecase." Ask for data covering your specific needs.

SIX CHOICES
of tubes and sockets

4130 alloy steel tube with alloy steel tip and socket.

403 stainless steel tube with alloy steel tip and socket.

403 stainless steel tube with 416 stainless tip and socket.

316 stainless steel tube with alloy steel tip and socket.

316 stainless steel tube with 303 stainless tip and socket.

"K" Monel tube with alloy steel tip and socket.

MARSH INSTRUMENT CO., *Sales affiliate of Jas. P. Marsh Corp.* Dept. Z, Skokie, Ill.
Marsh Instrument & Valve Co., (Can.) Ltd. • 8407 103rd St., Edmonton, Alberta, Can.

MARSH "THE STANDARD OF ACCURACY"

When inquiring check 4489 opposite last page

WHEN SPECS CALL FOR...
PRESSURE VESSELS
for the Chemical Processing Industry on the West Coast
Save on transportation costs, manufacturing time and put yourself in a more competitive position by contacting an experienced "on the spot" source when planning the procurement of process and plant equipment for the West Coast. Send prints for prompt quotation on your next job.
Craftsmen in Metals FOR INDUSTRY
Request Brochure No. M-57
PS F
PUGET SOUND FABRICATORS, INC.
Craftsmen in Metals
3670 E. Marginal Way • Seattle 4, Wash.
Craftsmen in steel plate and alloys up to 1"

When inquiring check 4490 opposite last page

In 7200-hr test . . .

. . . panel treated with Methylon® phenolic coating resin (middle panel) remained unaffected by immersion in alkaline soap solution. Panels coated with conventional phenolic resin (right) and alkydamine resin (left) were immersed only 200 hr. All panels were treated with one-mil coating and baked at optimum cure cycle, before being immersed at 165°F.

(Methylon® formulation suggestions and product information are available from Chemical Materials Dept., General Electric Co., Dept. CP, Pittsfield, Mass. . . . or check 4491 on form opposite last page.)

Titanium-clad steel offers protection at low cost

Made by high-vacuum brazing process

Outstanding corrosion resistance of titanium can now be obtained at a comparatively low cost with the introduction of titanium-clad steel. It is now considered practical to build vessels of titanium-clad.

Strongly bonded, ductile titanium-clad steel was first produced on a laboratory basis. It was later established that titanium-clad could be made by manufacturer's high-vacuum method known as the Hortonclad process.

Cladding of titanium on steel was only one of the problems which had to be overcome before the bonded material could be used in the production of large process vessels. A second and perhaps more troublesome problem was in the welding of titanium-clad plates.

After considerable experimentation, satisfactory welding procedures have been de-

PUMP LIQUIDS GASES SLURRIES

WITHOUT CONTAMINATION OR CORROSION

Wavelike Motion of Steel Fingers Forces Material Through Tubing

Write for Descriptive Literature

Cap. 0.2 cc. per min. to 4.5 G.P.M.
Prices **$60.00** to **$550.00**
depending on size and accessories

SIGMAMOTOR, INC.
18 North Main St. • Middleport, N.Y.

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SAVE YOUR PLANT*

from the Costly Effects of

AGGRESSIVE CORROSION

with **EPOXY MAINTENANCE FINISHES**

* PROTECTION . . . against acids, alkalis, solvents as well as the deteriorating effects of weather and corrosive fumes.

PROCESSING EQUIPMENT * BUILDING STRUCTURES

NINTEEN COLORS AVAILABLE
Epoxy Maintenance Finishes
Vinyl Maintenance Finishes

SEND FOR BOOKLET

HAUGER-BEEGLE ASSOCIATES, INC.
900 WEST 49TH PLACE CHICAGO 9, ILLINOIS

When inquiring check 4493 opposite last page

veloped, and it is now considered feasible to build titanium-clad processing vessels. Development work is now being carried on in the pilot vessel stage.

(Titanium Hortonclad is product of Chicago Bridge & Iron Co., Dept. CP, 332 S. Michigan Ave., Chicago 4, Ill. . . . or for more information check 4494 on form opposite last page.)

Fluorosilicone rubber withstands solvents and fuels

Satisfactory at temperatures from −80 to 400°F

Announcement is made of fluorosilicone rubber products which will function satisfactorily in contact with jet fuels, gasoline, oil, and solvents, at temperatures ranging from −80 to 400°F. Material does not deteriorate or swell extensively when exposed to fuels and solvents at these varying temperatures.

(Fluorosilicone rubber products are manufactured by The Kirkhill Rubber Co., Dept. CP, Brea, Calif. . . . or check 4495 opposite last page.)

"Nevertheless, I'm wearing it until our corrosion and contamination problems are checked!"

Thanks to Harold Money, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware

You Can't Find the Cost of a Valve on a Price List

With today's high maintenance expense, the cost of keeping a troublesome valve in repair can dwarf its original price in a few months' time. The minute a maintenance man touches a wrench to a valve, its cost is often doubled. That's why the purchasing trend is to *top quality* —the longest-lasting, most dependable industrial equipment on the market. And in the valve field, that means Lunkenheimer . . . famous for quality and maintenance-free service since 1862. The Lunkenheimer Company, Box 360 Annex Station, Cincinnati 14, Ohio.

LQ600-150
150 lb. S. P.
300 lb. W. O. G.

LQ600-200
200 lb. S. P.
400 lb. W. O. G. 550°F.

¼ to 2 inches

The cost of a Lunkenheimer Valve gets smaller...and smaller...and smaller... with each passing year of dependable service

WRITE FOR NEW FOLDER
"The Evidence in the Case"
Review Actual Case Histories from the Files of Industry on
HOW TO CUT MAINTENANCE

BRONZE • IRON • STEEL • PVC

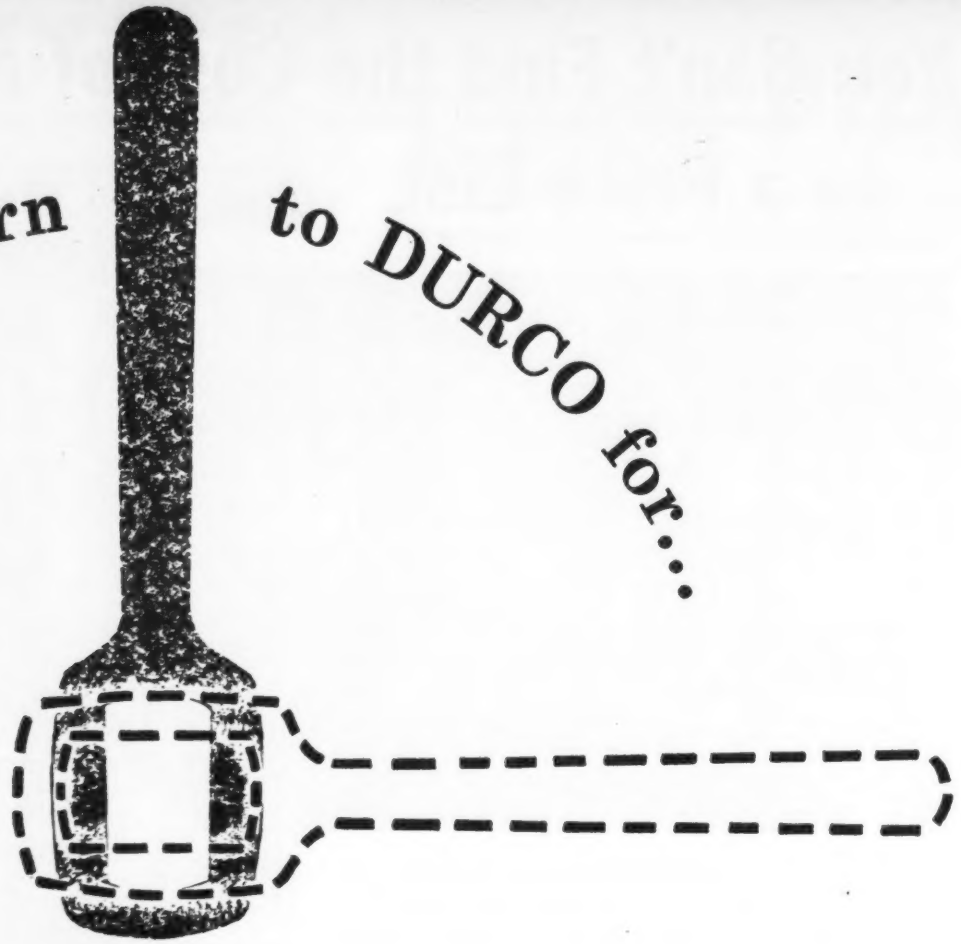
Z-467-17

LUNKENHEIMER QUALITY

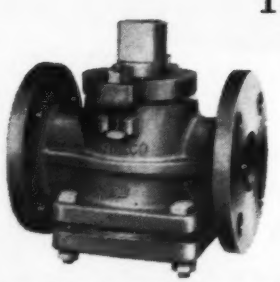
LUNKENHEIMER
THE ONE *Great* NAME IN VALVES

When inquiring check 4496 opposite last page

Turn to DURCO for...



Industry's best chemical service valves



Durco Type F valves are available in 150# and 300# design, as well as three-way. Complete details in Durco Bulletin V/4b.

Durco Type F valves with Teflon sleeves have been proven in thousands of industry's toughest applications to be trouble-free, maintenance-free, and dependable.

Turn to the Durco Type F valve for non-sticking, non-lubricated, economical operation. For long life when handling severe corrosives, get Durco Type F valves. Available in a wide range of alloys in sizes to 3".

DURCO
CORROSION RESISTING ALLOYS & EQUIPMENT

For more information on product at left, specify 4497 see information request blank opposite last page.

The DURIRON Company, Inc. / Dayton, Ohio

Branch Offices: Atlanta, Baltimore, Boston, Buffalo, Chicago, Cleveland, Detroit, Houston, Knoxville, Los Angeles, New York, Philadelphia, and Pittsburgh

Titanium resists acids: hydrochloric, sulfuric, and nitric

Ranks first among 14 metals tested 150 days at 70°C

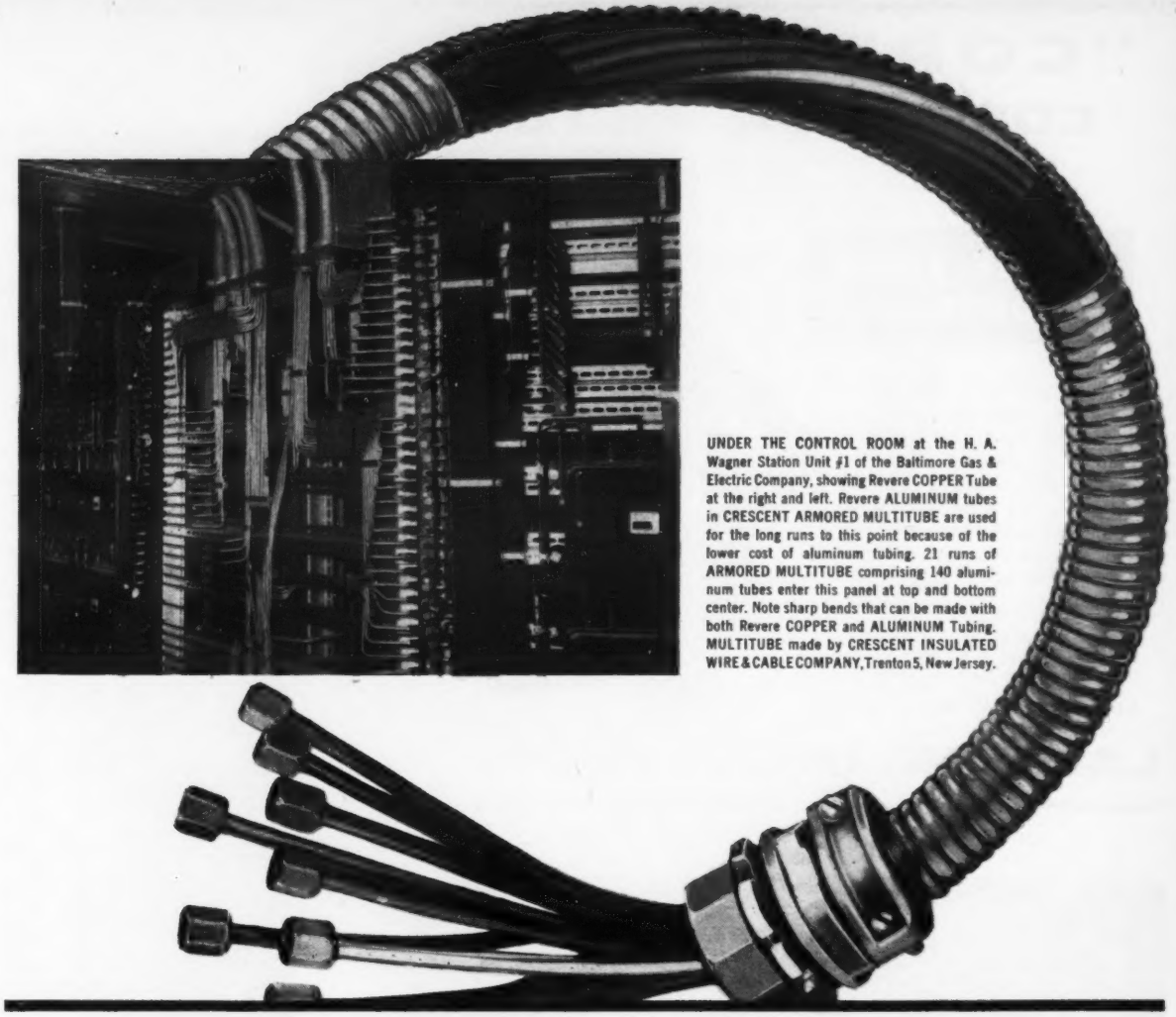
Results of tests run on 14 metals show that titanium has excellent resistance to combined fumes of hydrochloric, sulfuric, and nitric acids. Samples were exposed for 150 days at 70°C to fumes of these acids and mist from electrolysis of solutions containing their salts. The tests were run to find the metals most suitable for recovery equipment in the diamond country in Johannesburg, South Africa, where the above corrosive solutions are used.

Sample	Test results % loss in weight
titanium	0.02
lead	0.03
zirconium	0.13
nickel	1.94
cobalt	2.66
tin	3.12
stainless steel	3.32
zinc	4.07
vanadium	4.30
Monel	4.78
brass	6.57
copper	7.25
aluminum	14.25
mild steel	22.45

(For more information on titanium contact Titanium Metals Corp. of America, Dept. CP, 233 Broadway, New York 7, N.Y. . . . or for more information check 4498 on form which is located opposite last page.)

Nickel-base alloy data

Up-to-date information on four nickel-base alloys is presented in 104-page booklet. Chemical compositions, and physical, mechanical, and high-temperature properties are described. Comparative resistance table to over 250 corrosives commonly handled in chemical, petroleum, paper, pulp, pharmaceutical, and metal-working industries is included. "Hastelloy Corrosion-Resistant Alloys" — Haynes Stellite Co., Div. of Union Carbide Corp., Dept. CP, 420 Lexington Ave., New York 17, N.Y. Check 4499.



UNDER THE CONTROL ROOM at the H. A. Wagner Station Unit #1 of the Baltimore Gas & Electric Company, showing Revere COPPER Tube at the right and left. Revere ALUMINUM tubes in CRESCENT ARMORED MULTITUBE are used for the long runs to this point because of the lower cost of aluminum tubing. 21 runs of ARMORED MULTITUBE comprising 140 aluminum tubes enter this panel at top and bottom center. Note sharp bends that can be made with both Revere COPPER and ALUMINUM Tubing. MULTITUBE made by CRESCENT INSULATED WIRE & CABLE COMPANY, Trenton 5, New Jersey.

CRESCENT relies on REVERE

for dependable performance of its instrumentation and control tubing

REPORTS, "NOT ONE FAILURE."

The dependable performance of Revere Copper Tube in Crescent Armored Multitube*, ever since its inception, has led the CRESCENT INSULATED WIRE & CABLE COMPANY to fill its aluminum tube needs with Revere also.

In fact, Crescent, since it first started using Revere Copper Tube in 1953, reports not a single failure. And that's mighty important in instrumentation and control tubing service where utilities, chemical processing, petroleum, paper and similar industries can't afford the luxury of process failures.

Crescent Multitube, using either Revere Copper or Aluminum Tube, or both in combination, offers a completely protected installation for permanence, lower original installation cost, lower maintenance and a saving of time, space and money.

Crescent Armored Multitube consists of a group of Revere Copper or Aluminum Tubes, twisted together in cable form, protected by a flexible interlocked galvanized steel armor. Constructions are available employing plastic sheaths in combination with the armor for corrosive locations. Section of cabled tube pictured shows how Copper or Aluminum Tubes are encased inside the Armored Multitube. As many as 37 tubes of ¼" OD can be cabled in lengths up to 1,000 ft.

For details on Multitube write Crescent and for uniform quality copper and aluminum tube, speedily delivered, see the nearest Revere Sales Office. *Reg. Trademark

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N. Y.

Mills: Rome, N. Y.; Baltimore, Md.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Brooklyn, N. Y.; Newport, Ark.; Ft. Calhoun, Neb. Sales Offices in Principal Cities, Distributors Everywhere.

COPPER • BRASS • REVERE • ALUMINUM

When inquiring check 4500 opposite last page

"CORRO-DEX"
CORROSION METER

based on work by The Pure Oil Co.
Oil and Gas Journal 54 No. 29, 135
(1955)

SINGLE KNOB CONTROL

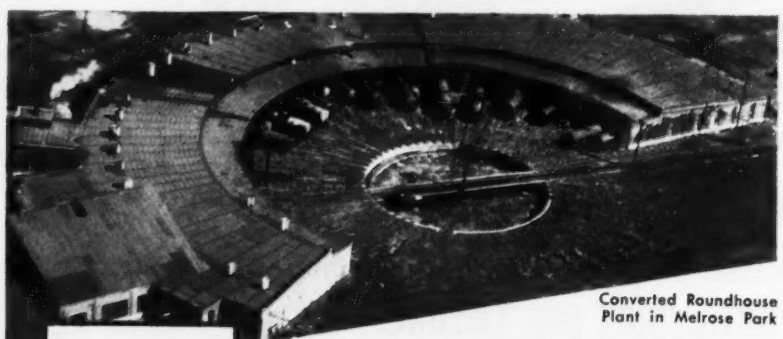
Measures corrosion directly in micro-inches. Flashlight battery operated for use in field or lab. Detects corrosion of less than 0.000001 inch. Simplified stabilized circuit . . . no probe polarization . . . shock-proof all-transistor circuit. All types of probes available. Order NOW, only **$425** (PROBES EXTRA)

9" Long x 6" Wide x 9" High. Weighs ONLY 7 POUNDS.
115 Volt Line Operated Corrodex available also.

ASK FOR DESCRIPTIVE BULLETIN NO. CP-7

LABLINE, INC. 3070 West Grand Avenue Chicago 22, Illinois

When inquiring check 4501 opposite last page



Converted Roundhouse Plant in Melrose Park

AVAILABLE LINING MATERIALS
Phenolics
Epoxies
Vinyls
Plastisols

Applicators Of
Amercoat
Bisonite
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ENLARGED • INCREASED
Facilities . . .
for fighting corrosion with protective coatings
AT LITHCOTE

Lithcote's converted roundhouse plant at Melrose Park, Ill., has tripled tankcar capacity. We have also expanded all other operations at both the Melrose Park, Ill., and Norwalk, Conn., plants offering greatly increased services for applying all types of protective coatings and linings for industrial equipment. Field crews maintained for on-site applications. ***For further information on how we can service your coating needs write to:***

LITHCOTE CORP. 5000 Lake St. Melrose Park, Ill.

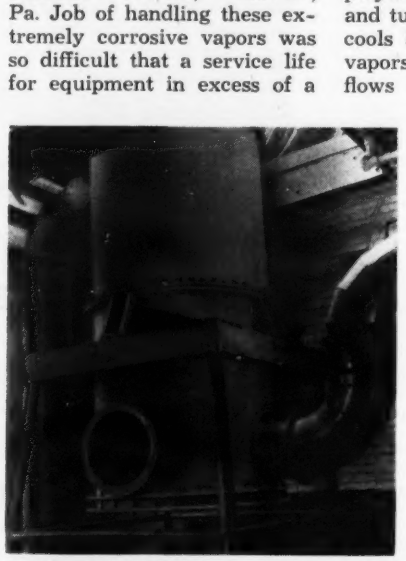
When inquiring check 4502 opposite last page

Production of platinum at J. Bishop and Co. requires use of aqua regia. Cooling the corrosive vapors from 150°F is no easy task. Here's how they are . . .

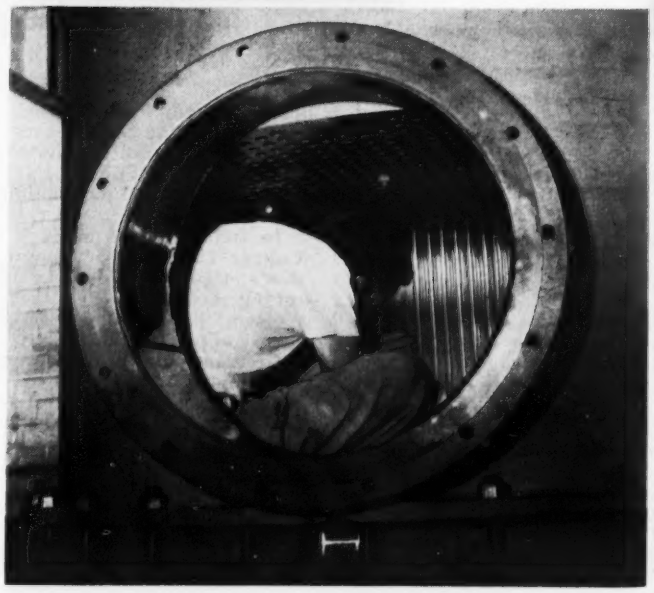
cooling aqua regia with PVC heat exchanger

Problem: Cooling aqua regia vapors wreaked havoc with heat exchange equipment at J. Bishop and Co. Platinum Works, Malvern, Pa. Job of handling these extremely corrosive vapors was so difficult that a service life for equipment in excess of a year was considered satisfactory.

Solution: A little over a year ago, Bishop installed a polyvinyl chloride lined shell and tube heat exchanger. Unit cools 5000 cfm of aqua regia vapors from 150 to 100°F. Gas flows on shell side, cooling



Steel shell of heat exchanger is PVC lined. Pipes at left and right are 100% PVC, unsupported



Glass and PVC team up in this heat exchanger for aqua regia

water in tubes.

Steel shell is PVC lined 4'4¼" ID x 13'6⅛" long in two sections flanged in the center with PVC lining rolled out onto flange to form integral gasket. Heads are PVC-lined steel. Tube sheets are 2" PVC, drilled out to receive 1275 Pyrex glass tubes ⅜" diameter x 10' long. Tubes are sealed from shell with Hypalon rubber stoppers.

Tube sheets were strong enough despite 1275 half-inch holes to support weight of a man during assembly.

Results: Heat exchanger has been in operation for more than a year with no sign of failure. None of PVC-lined equipment gives any indication of deterioration in spite of constant exposure to extremely corrosive aqua regia vapors.

(For more information on PVC-lined heat exchanger contact Haveg Industries, Inc., Dept. CP, 900 Greenbank Rd., Wilmington, Del. . . . or check 4503 opposite last page.)

Corrosion inhibitor protects steel

This photograph illustrates how Polyrad inhibitor, a rosin amine derivative, can protect steel. Photo shows a piece of mild steel, the center of which was treated with the inhibitor. Entire specimen was then immersed in an acidic environment. Tiny bubbles of hydrogen show the start of corrosion — but the center portion protected by the inhibitor remains a safety island.

(Polyrad corrosion inhibitor is product of Hercules Powder Co., Dept. CP, Wilmington 99, Del. . . . or check 4504 opposite last page.)

Alkyd resin kettle fabricated by Process Engineering & Machine Co., Inc., Elizabeth, N. J.

Lukens clad steel cuts kettle cost

Purity—with economy—assured in alkyd resin vessel

Utmost purity of alkyd resins to give highest gloss and reflectivity to paints. That's just one advantage gained by fabricating this Dowtherm-heated alkyd resin kettle from Lukens 316 stainless-clad steel. Of equal importance is the first-cost economy this material offers.

John Lucas & Co. of Gibbsboro, N. J. achieved faster heat transfer with stainless-clad, and hence greater process efficiency, because of this material's carbon steel backing. The clad steel cost them less than solid high alloy. And, despite the kettle's many fittings and two jackets, fabrication presented no great difficulty.

Lukens clad steels, from 3/16" gage up, have achieved new economies and efficiency throughout the chemical industry. Only Lukens makes available a choice of 16 cladding and 11 backing metals to meet virtually any tank or pressure vessel need. *Consult your equipment builders or write for new technical booklet, "Clad Steel Equipment." Address Manager, Marketing Service, Room 950, Lukens Steel Company, Coatesville, Pennsylvania.*

This is Lukens clad steel—not a lining, not a soldered-on surface, but a solid steel plate—one side corrosion resistant metal permanently bonded over-all to rugged, economical backing steel.

LUKENS

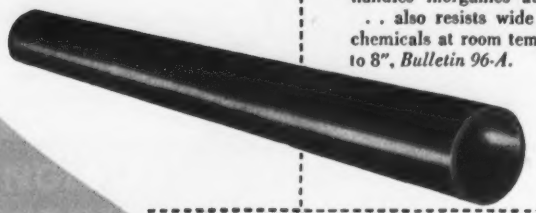
Helping industry choose steels that fit the job

When inquiring check 4506 opposite last page

FOR HOT CORROSIVES:

ACE TEMPRON

Heat-resistant nitrile hard rubber pipe handles inorganics at 250-275 deg. F. . . also resists wide range of organic chemicals at room temperature. Sizes 1" to 8", *Bulletin 96-A.*

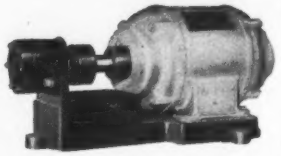


Only the Right piping can deliver a "GOOD RUN"

For profitable runs you must keep equipment "on stream" full time with no corrosion shut-downs. Protect your profits with Ace piping, pumps, valves, and tanks. Many rubber and plastic materials . . . backed by a century of chemical experience. Get facts today from American Hard Rubber Company.

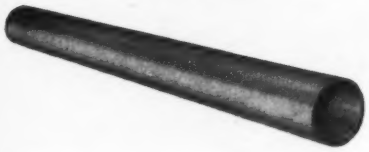
MIGHTY MIDGET

for pumping acids



Jabsco neoprene-impeller pump made of ACE hard rubber outlasts, out-pumps anything in its pressure, size and price class. Capacity from 15 gpm. at 22 ft. head to 5 gpm. at 72 ft. head. *Bulletin 97-A.*

SENSITIVE, BUT KEEPS YOUR HEAD



TOUGH ACE-ITE PLASTIC PIPE

General-purpose moderately priced rubber-plastic pipe handles most common chemicals to 170 deg. F. . . . except few strong acids and organic solvents. Tough, odorless, tasteless. Rigid pipe ½" to 6". *Bulletin 80.*

ACE Darling Swing Check Valve . . .

lined with ACE hard rubber for the best in corrosion resistance. Large, straight-through flow areas. Sensitive to slight pressure differential. Non-slamming. Sizes 2" to 24". *Bulletin CE-52.*

ACE processing equipment of rubber and plastics

AMERICAN HARD RUBBER COMPANY

93 WORTH STREET • NEW YORK 13, N. Y.

When inquiring check 4507 opposite last page

CORROSION

Film thickness of 5 mils lengthens life, lowers costs

Uses: For heavy-duty corrosion-resistant coatings.

Features: One spray deposits film thickness of 5 mils, resulting in higher corrosion resistance per coat and lower application costs. Good flow-out characteristics provide smoother coating, and brushability is excellent.

Description: Vinyl coating is designed to be sprayed at full solids, 45% by weight, either in standard "cold" spraying technique, or in hot spray technique, using any of standard paint heaters. Coating will exhibit slightly better flow-out, gloss, and somewhat quicker dry in hot spray units.

(Lankote 200-H series coating is available from J. Landau & Co., Inc., Dept. CP, Washington Ave., Carlstadt, N.J. . . . or check 4508.)

Corrosion-resistant welding fittings

Detailed information on allowable working pressures and corrosion resistance of welding fittings is contained in 46-page bulletin. Bul 414A — Welding Fittings Corp., Dept. CP, New Castle, Pa. Check 4509.

"If I didn't know better I'd say it was corrosive!"

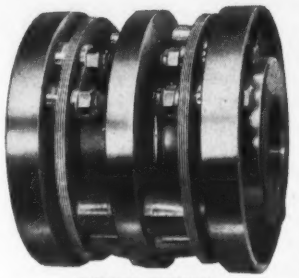
Thanks to James V. Redding, The Central Pharmacal Company, Seymour, Ind.

FOR MAINTENANCE FREE POWER TRANSMISSION

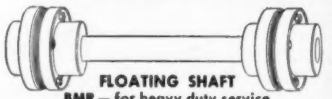
Specify

THOMAS

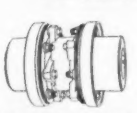
FLEXIBLE COUPLINGS



DOUBLE FLEXING
DBZ — for high speed, heavy duty drives



FLOATING SHAFT
BMR — for heavy duty service with excessive misalignment



DOUBLE FLEXING
AMR — for engine and medium speed drives

SINGLE FLEXING
SS — for engine-driven generator sets with out-board bearings

Thomas' 40 years of flexible coupling experience is at your disposal to help you meet ordinary applications or special variations for unusual cases.

UNDER LOAD and MISALIGNMENT ONLY THOMAS FLEXIBLE COUPLINGS OFFER ALL THESE ADVANTAGES.

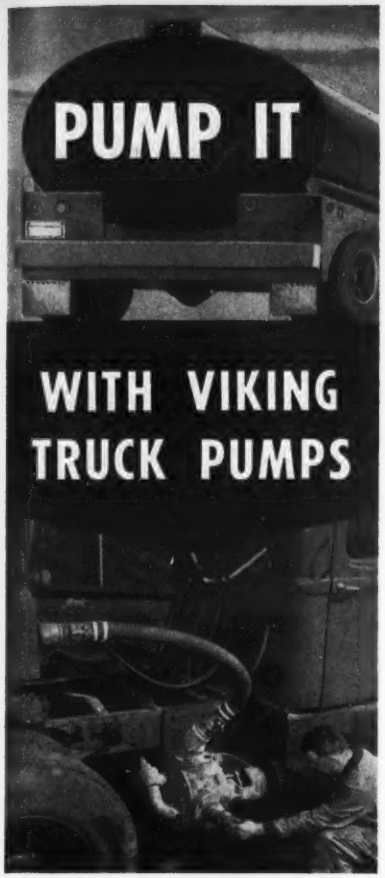
1 Freedom from Backlash Torsional Rigidity
2 Free End Float
3 Smooth Continuous Drive with Constant Rotational Velocity
4 Visual Inspection While in Operation
5 Original Balance for Life
6 No Lubrication
7 No Wearing Parts
8 No Maintenance

Write for Engineering Catalog 51-A

THOMAS FLEXIBLE COUPLING CO.

WARREN, PENNSYLVANIA, U. S. A.

When inquiring check 4510 opposite last page



. . . and SAVE valuable loading and unloading time

If you are transporting a liquid or semi-solid, you will save valuable time and money when you load and unload with a POSITIVE Viking truck pump.

Powered from the truck, through power take-off from the transmission, the Viking positive pump keeps the truckload on the move — not standing idle with slow gravity filling and emptying.

Equipped with integral Viking relief valve, the discharge line may be shut off without stopping pump.

Available in 35, 50, 90, 200 and 300 GPM sizes. Ask today for Catalog Gcc and SP377cc.

VIKING PUMP CO.
Cedar Falls, Iowa, U.S.A.
In Canada, it's "*ROTO-KING*" pumps
SEE OUR CATALOG IN SWEETS PLANT ENGINEERS FILE

When inquiring check 4511 opposite last page

CUT HERE AND FILE

CORROSION KEYS

Titanium (Commercially pure)

DONALD L. MACLEARY,
Metallurgical Engineer, E. I. du Pont de Nemours and Company, Incorporated

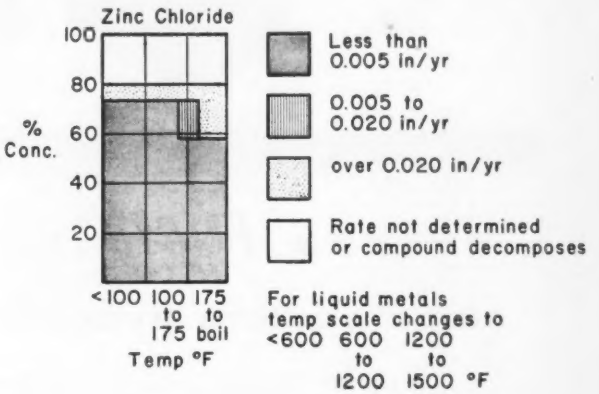
"Corrosion Keys" are copyrighted (1957) *by Putman Publishing Company.*

These data are applicable to unalloyed, commercially pure grades of titanium. Test data available on titanium base alloys indicate that they possess similar corrosion resistance although not quite equal.

Information that cannot be incorporated into Corrosion Keys, but equally important to corrosion engineers and equipment designers, concerns the fact that chloride solutions do not produce stress corrosion cracking in titanium. Red fuming nitric acid containing less than 1.5% water is the only known chemical that will produce stress corrosion cracking. This same low water solution is capable of igniting titanium with explosive force. Titanium will also ignite and burn in chlorine gas containing less than 0.35% water at room temperature and containing less than 0.60% water at 100°C.

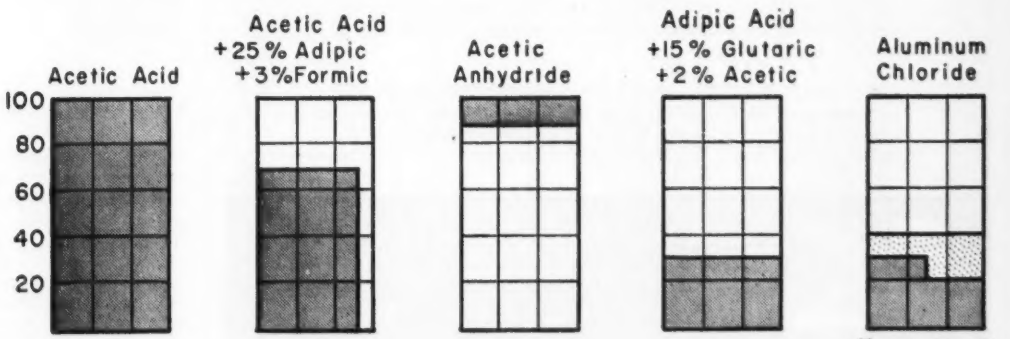
Titanium also resists pitting, galvanic, and cavitation attack. Concentrated solutions of aluminum chloride and zinc chloride will produce pitting but the general corrosion rates for these solutions are too high (over .020 in/yr) to consider using titanium anyway.

When coupled to dissimilar metals in sea water tests, the position of titanium (passive) in galvanic series is found to be with the passive 18-8 stainless steels and passive Inconel. However, if its passive film is destroyed by a reducing environment, its position is moved up in the series between magnesium and zinc. Titanium has a very high order of resistance to high velocity fluid flow. Its cavitation resistance is 100% at 27 fps.



These Corrosion Keys are intended for rapid preliminary selection of materials. They are not intended to show what is best for a specific service. Manufacturer should be consulted for further information in regard to a given application.

(Further information on titanium can be obtained from Specialty Products Section, E. I. du Pont de Nemours & Co., Inc., Dept. CP, Wilmington 98, Del. . . . or check 4512 on form opposite last page.)



Turn to page 69

VYFLEX *FLIGID*® lining

stops sodium hypochlorite

The problem solved by lining the tank shown above with Fligid is particularly important because it is so widespread. Invaluable as an industrial bleach, sodium hypochlorite has a voracious appetite for just about every known lining or coating material. The bleach decomposes some on contact. It permeates others, raising gas blisters that force the lining away from the tank wall.

But nothing happens to *Fligid!* Sodium hypochlorite is completely powerless against this amazing new laminate of two different Polyvinyl Chloride based membranes. Furthermore, the cost of *lining* a tank with Fligid is *negligible* compared to the cost of *replacing* the tank.

The exposed face of *Fligid* is unplasticized PVC, able to resist the widest range of corrosives, at temperatures to 190 F in many solutions. There's no plasticizer to leach out and contaminate reagents. And this outer face is harder and more abrasion resistant than any other lining material. The inner face is resilient, flexible PVC, easily applied to steel, wood, or concrete, by simple adhesive bonding techniques with no curing. Qualified Kaykor applicators across the United States and Canada give fast, professional service applying *Fligid* to any size or shape structure in the field or in the shop.

GET THE FACTS! Write now for the complete story, including all technical data, in the just published technical sheet "Fligid"... free on request to Kaykor Industries, Inc., 4401 Broad Street, Yardville, New Jersey.

KAYKOR INDUSTRIES, INC.
Division of Kaye-Tex Manufacturing Corp.
YARDVILLE, NEW JERSEY

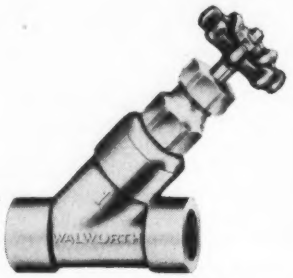
When inquiring check 4513 opposite last page

Tight shutoff, full control of corrosive fluids with PVC valve

Uses: For regulating flow of corrosive fluids.

Features: Unit gives full flow passage and provides tight shutoff. Lightweight and durable, valve is non-toxic and corrosion resistant.

Description: PVC Y-globe



PCV valve is designed for use with corrosive fluids

valve has special bonnet and gland nut design to prevent leaking. Life of valve's packing is prolonged through tapered back seat on stem which permits repacking under pressure. Design also reduces pressure on stem packing when valve is opened completely. Available with threaded and solvent-weld socket-type ends, valve has about 1/6 weight of equivalent conventional valve. It is applicable for 1" pipe. Other sizes, from ½ through 2", are planned.

(PVC Y-globe valve is product of Walworth Co., Dept. CP, 60 E. 42nd St., New York, N.Y. . . . or for more information check 4514 on form which is located opposite last page.)

Wire mesh for filtering

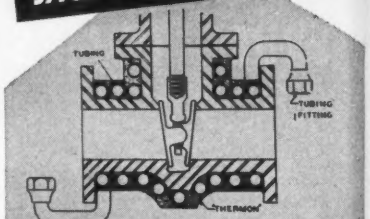
Folder of four pages describes, illustrates, and lists properties of corrosion-resistant wire mesh for better control of filtration and flow of fluids, and for use at substantially higher temperatures. Release 215 — The Pall Filtration Companies, Dept. CP, Glen Cove, N.Y. Check 4515.

Thermon

The Revolutionary New Solid

HEAT TRANSFER MEDIUM

SAVINGS UP TO 75% over JACKETED EQUIPMENT



Typical Thermonized Valve Section

Thermon, the product, and Thermonizing, the process, represent a revolutionary new concept in the science of external heat application. Thermon is a non-metallic plastic compound with highly efficient heat transfer properties, and is easily applied in a viscous paste form over either steam traced or thermal electric systems. It completely surrounds the tracer tubing and conducts heat to the entire surface to be heated.

Definite Advantages of Thermonizing are:

1. LOW COST—save up to 75% over equal jacketed equipment.
2. EXCELLENT HEAT TRANSFER —Exceeds steam traced equipment approximately 1100% and very closely approaches jacketed equipment.
3. DEPENDABILITY—no hot or cold spots.
4. WIDE TEMPERATURE RANGE —used for sub-zero cooling or heating to 750°F.
5. NO JACKET PLUGGAGES OR PRODUCT CONTAMINATION —in case of equipment failure, Thermon separates product from heating medium.
6. GOOD MECHANICAL AND THERMAL SHOCK RESISTANCE —cracking, spalling, and degradation are all nil—less than 1% linear shrinkage.
7. ADAPTABLE—may be used with either steam traced or thermal electric equipment—installed at our shops or your job location.
8. RAPID DELIVERY—use of standard equipment permits minimum delivery time.

Write for comprehensive brochure about revolutionary Thermon!

THERMON MFG. CO.
1017 Rosine • P.O. Box 1961
Houston, Texas

When inquiring check 4516 opposite last page

BASIC FACTS . . .

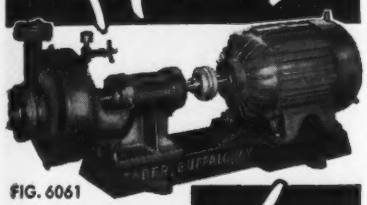


FIG. 6061

for DECIDING ON TYPE OF PUMP; Write for TABER BULLETIN S-146

Fig. 19,488

Practical GUIDE TO PUMP SELECTION

Big illustrations and brief descriptions with capacities and adaptability of pumps are contained in this unbiased compilation of facts to help avoid costly mis-application. Bulletin S-146.

TABER PUMP CO.
Est. 1859
320 Elm St.,
Buffalo 3,
N. Y.

TABER

When inquiring check 4517 opposite last page

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CORROSION KEYS: *Titanium*

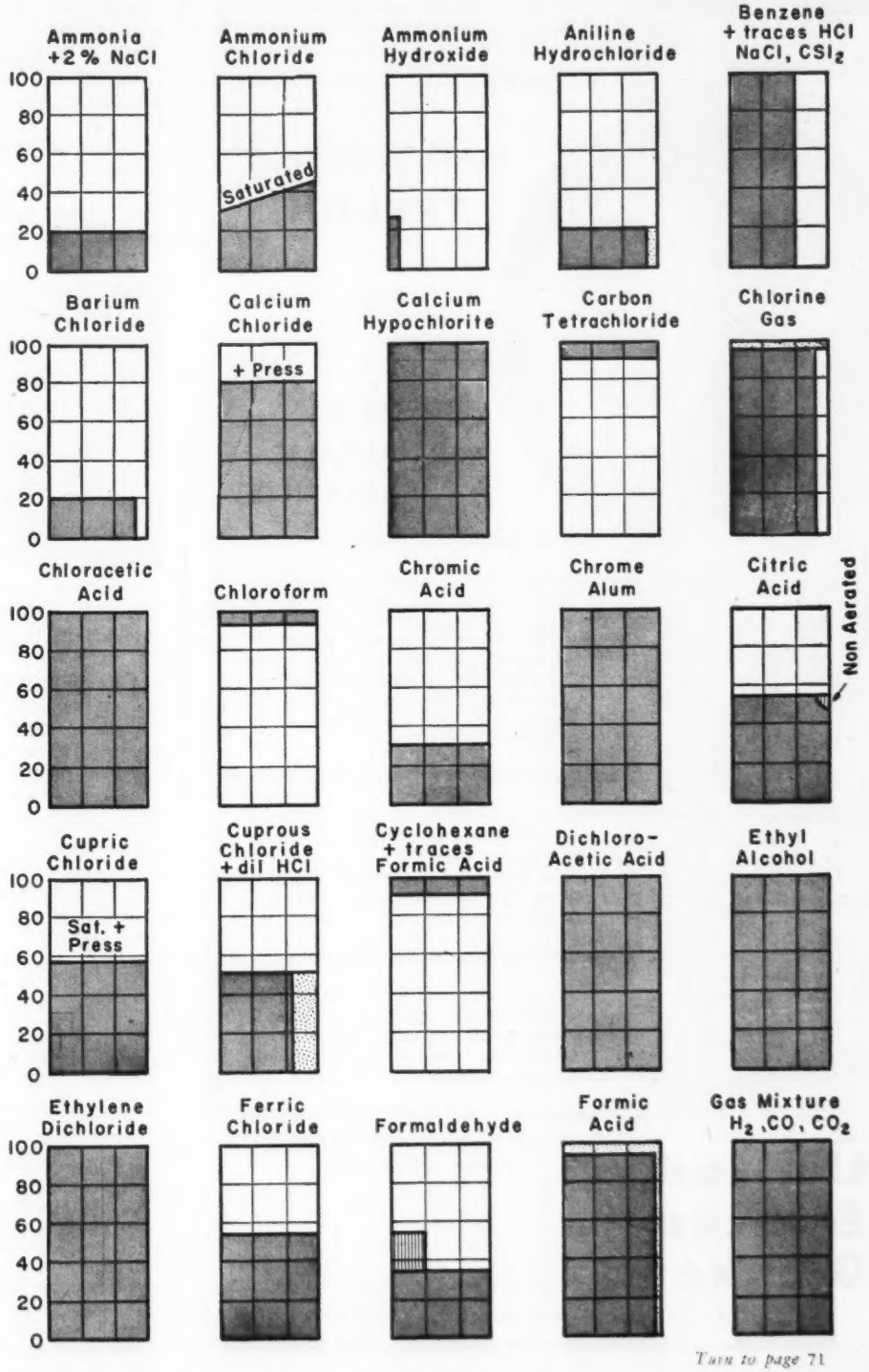
Starts on page 67

Less than 0.005 in/yr

0.005 to 0.020 in/yr

over 0.020 in/yr

Rate not determined or compound decomposes



Turn to page 71

Chemiseal Gaskets

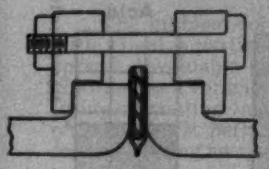
AND ACCESSORIES FOR CHEMICAL PIPING

Chemical Expansion Joints and Flexible Couplings absorb shock and vibration, thermal expansion and contraction. Correct misalignment. Connect unlike piping ends and nozzles. Companion Products to the famous Garlock Rubber Expansion Joints. Catalog No. AD-137.

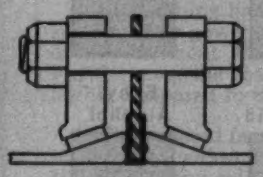
made of duPont TEFLON

impervious to

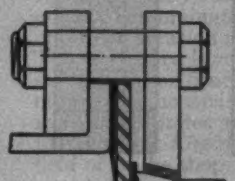
- **ACIDS**
- **ALKALIES**
- **SOLVENTS**



Chemiseal Jacketed Gaskets. Compressed asbestos sandwiched between woven asbestos and contained in Type 1 Teflon envelope. Ideal for sealing glass-lined steel connections. One of many types utilizing filler constructions ranging from soft woven asbestos to corrugated stainless steel, depending on service requirements. Catalog No. AD-154.



Chemiseal Jacketed Gaskets. Standard for Corning conical flanges. Neoprene filler. Type 2 Teflon envelope with flat surface fitting flush with pipe I.D., permitting free flow of medium. Catalog No. AD-154.



Chemiseal Reducers. A steel bearing ring provides rigidity. Resilient core assures safe seal at low bolt loads. Teflon Jacket protects and contains easy-to-handle single unit. Catalog No. AD-154.

United States Gasket Company
Camden 1, New Jersey

United States Gasket *Plastics Division*
OF THE GARLOCK PACKING COMPANY

When inquiring check 4518 opposite last page

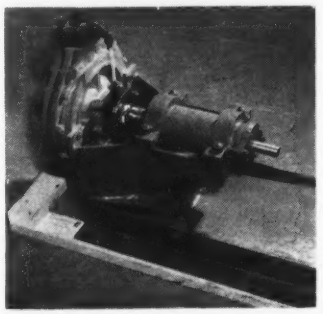
Saran-lined pump handles many corrosives

Special seals eliminate packing gland leakage

Uses: For pumping corrosive liquids.

Features: Mechanical rotary seals are designed to eliminate high frictional heat failures and resultant leakage problems of packing glands.

Description: Centrifugal pumps are completely lined with saran. Rotary seals can be easily changed for adapting pump to handling various corrosive fluids. Seal-cooling system employs either fluid being pumped or water from external source as cooling mediums.



Saran-lined centrifugal pump's specially designed seals eliminate packing gland leakage

(Information on saran-lined pump can be obtained from Saran Lined Pipe Co., Dept. CP, 2415 Brudette Ave., Ferndale 20, Mich. . . . or check 4519 opposite last page.)

Tape coatings catalog

Method of application of protective tape coating to pipe is explained in 25-page catalog. Case histories of applications, including preparation of surfaces, how they are coated, and inspection are cited. Diagrams, drawings illustrate advantages of wrapping with polyethylene tape. "Polyken" Protective Coatings — Polyken Sales Div., The Kendall Company, Dept. CP, 309 W. Jackson Blvd., Chicago 6, Ill. Check 4520.

DO YOU REQUIRE MORE EFFICIENT **DEWATERING SIEVING or GRADING** in your chemical processing **OPERATION?**

The answer to your problem may lie in using...

H&K

PERFORATED METAL SCREENS

MADE FOR LONG LIFE, H & K screens can be perforated in stainless steel, monel or other corrosion-resistant alloys. Easy to keep clean H & K perforated screens can be furnished to specified size or shape in practically any material from foil-thin to 1" thick.

Contact either H & K office or an agent. We will be glad to work with you on your perforated screen requirements.

FILL IN AND MAIL COUPON TO OFFICE AND WAREHOUSE NEAREST TO YOU.

FIND NEAREST H&K AGENT IN THE 'Yellow Pages'

Listed Under "Perforated Metals"

THE **Harrington & King** PERFORATING CO. INC.

Chicago Office and Warehouse
5636 Fillmore Street
Chicago 44, Ill.

New York Office and Warehouse
110 Liberty Street
New York, N.Y.

Please send me—

☐ GENERAL CATALOG NO. 62
☐ STOCK LIST of Perforated Steel Sheets

NAME_____
TITLE_____
COMPANY_____
STREET_____
CITY_____ ZONE_____ STATE_____

When inquiring check 4521 opposite last page

WITH **PLASTIC STEEL®**

A DEVCON PRODUCT

80% STEEL — 20% PLASTIC

Stop that leak quickly, permanently and easily . . . apply PLASTIC STEEL directly to the tank or on a piece of kraft paper and the problem is solved. PLASTIC STEEL has excellent chemical resistance . . . will not rust or corrode . . . self-curing, hardens even under water.

PLASTIC STEEL will repair leaking pipes (even under pressure) . . . rebuild worn valve seats or pumps . . . fill large or small holes in castings . . . repair or rebuild machinery . . . make molds and dies . . . handle hundreds of maintenance jobs in the plant. PLASTIC STEEL bonds steel, iron, brass, bronze, aluminum, wood, glass, concrete, etc., to itself or each other. Non-shrinking, non-expanding it has extreme strength and durability . . . can be drilled, threaded or ground with regular metal-working tools.

PLASTIC STEEL can save hundreds of hours and thousands of dollars, throughout your plant — write for free booklet containing proof of its many applications.

DEVCON CORPORATION

135 Endicott Street, Danvers, Mass.

When inquiring check 4522 opposite last page

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CORROSION KEYS: *Titanium*

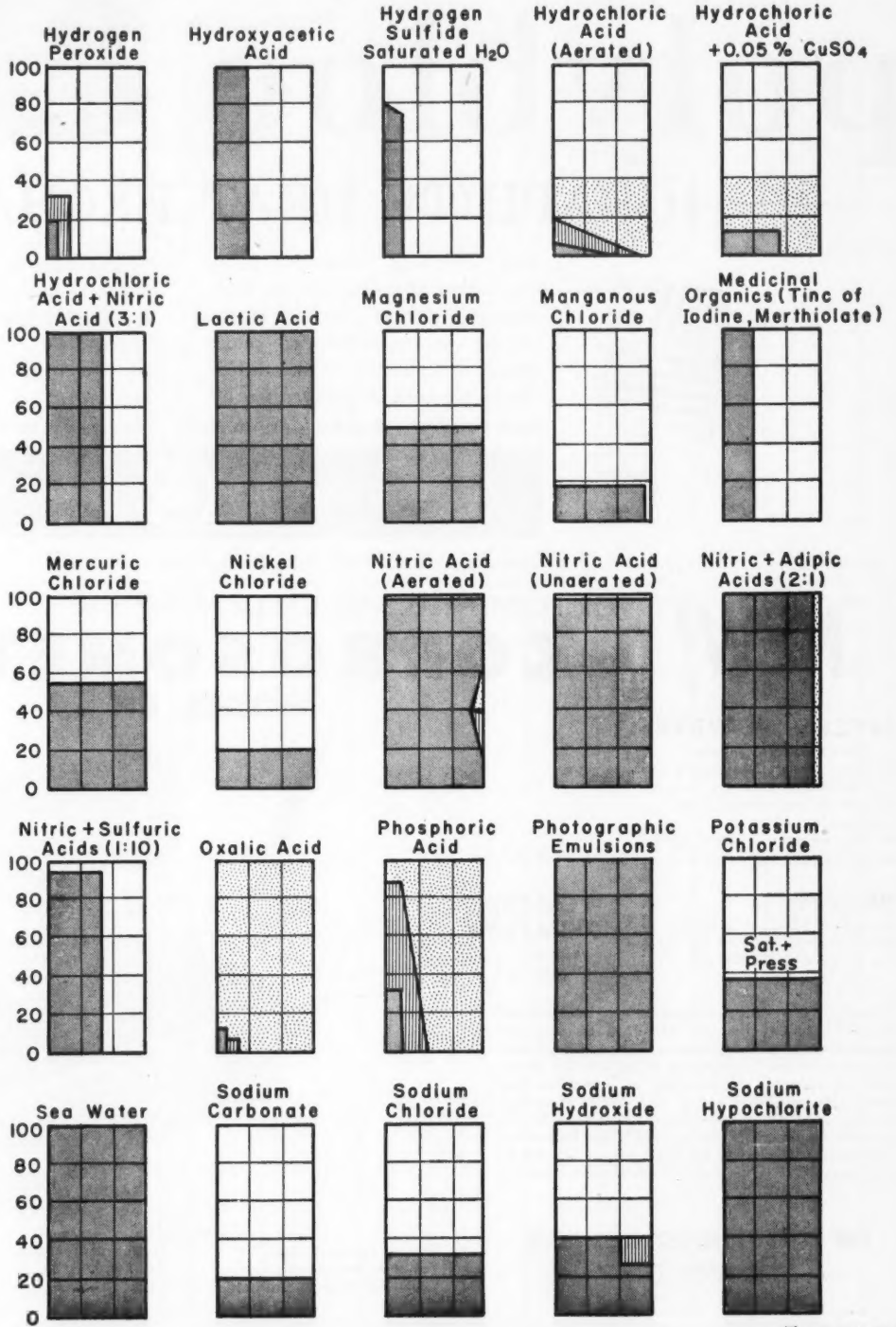
Starts on page 67

Less than 0.005 in/yr

0.005 to 0.020 in/yr

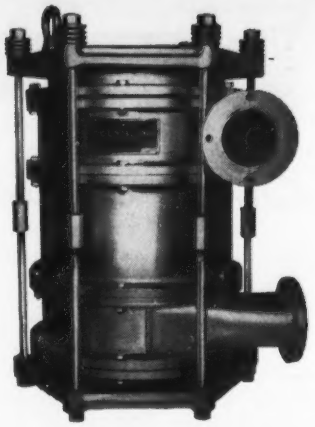
over 0.020 in/yr

Rate not determined or compound decomposes



Turn to page 73

No fragile tubes
No danger from leakage
Complete corrosion resistance
No cemented joints
Freedom from mechanical and thermal shock



polybloc

GRAPHITE HEAT EXCHANGER

The "Polybloc" Graphite Heat Exchanger is constructed of high strength, molded graphite blocks which are impervious to acids, alkalis and solvents. These stacked blocks are held in compression by external spring loaded tie bars to insure ruggedness, freedom from shock and leakage. In addition, this construction eliminates the need for cemented joints or fragile tubes.

Quick Delivery • Guaranteed Performance • Designed to Meet Your Specifications

Write for 14-page Engineering Manual

THE CARBONE CORPORATION BOONTON, NEW JERSEY

When inquiring check 4523 opposite last page

NEW! FOR BOTH FIELD AND LABORATORY USE THE CORROSOMETER MODEL CK

SPECIAL FEATURES:

1. Line or battery operated
2. Reads wire, tube and strip probes 1 to 80 mils thickness
3. Cancels any noise pick-up in cable lead
4. With no polarization of probe
5. Lightweight aluminum case — weatherproof, durable

PROBES
More than 50 alloys in stock
For temperatures up to 700°F.
For pressures to 10,000 psi.

TWO-STEP OPERATION
Set voltage
Read corrosion

Following the wide acceptance of the original Corrosometer as the new standard of corrosion measurement, Crest Instrument Company is pleased to announce the introduction of its new CK Meter with its patented temperature compensation feature. This instrument and its wide range of sensing probes combine the developments of both Standard Oil Company (Indiana) and Crest Instrument Company and embody the principles of Standard's U.S. patent 2,735,754 under which Crest is licensed.

THE CORROSOMETER CUTS YOUR CORROSION COSTS

AREA DISTRIBUTORS
Magna Products, Inc.
11808 S. Bloomfield Ave.
Santa Fe Springs, California

Magna of Texas
Laird Hill Road
Kilgore, Texas

IN CANADA
Inman Industries Ltd.
5405 W. Boulevard
Vancouver 13, B. C.

CREST INSTRUMENT COMPANY, Santa Fe Springs, California

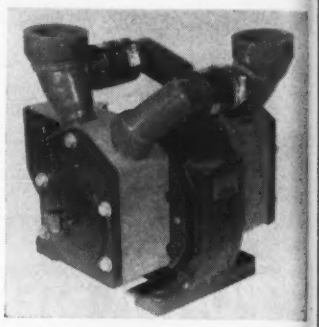
When inquiring check 4524 opposite last page

CORROSION

Pumps corrosive liquids, abrasive slurries at rates of 40 gpm

Pump is designed to deliver pulsation-free flow

Uses: Pumping corrosive liquids, gases, abrasive slurries, pharmaceuticals or viscous fluids.



40 gpm pump uses no stuffing boxes or shaft seals

Features: Duplex diaphragm pump is self-priming and delivers balanced fluid flow free from pulsation. Parts are available in natural and synthetic rubbers, plastic and stainless steel. Design eliminates need for stuffing boxes or shaft seals.

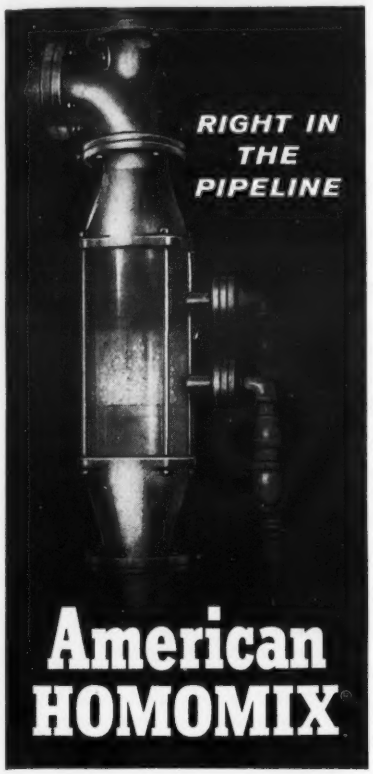
Description: Pump delivers 40 gpm at atmospheric discharge, 32 gpm at 20 psi and 19.5 gpm at 40 psi. For discharge pressures up to 25 psi, one-hp drive is used. Above 25 psi, 1½-hp drive is needed.

(Duplex flex-i-liner pumps are manufactured by Vanton Pump and Equipment Corp., division of Cooper Alloy Corp., Dept. CP, Hillside, N.J. . . . or for more information check 4524A on form opposite last page.)

Teflon-faced valve

Catalog of 12 pages on manufacturer's line of diaphragm valves for chemical industry features information on Teflon-faced diaphragm valve suitable for corrosive applications, Cat 104 — Hills-McCanna Co., Dept. CP, 3025 N. Western Ave., Chicago 18, Ill. Check 4525.

CONTINUOUS
LIQUID, GAS OR SLURRY
CHEMICAL MIXING



American HOMOMIX®

Gives instant, uniform, complete mixing
without a mixing tank

Saves space, time and equipment. Simplifies and speeds the blending of one or more chemicals. Permits a wide range in the percentage of additives to base fluid and assures accurate, economical mixing control. Any number of diffusing stages can be selected. Provides for visual inspection of the mixing operation and access to diffusing impeller. Can be equipped with lift stage. Can be made of standard or special material and protectively coated. Easily installed in vertical, horizontal or inclined position. Wide range of sizes and capacities from 1 GPM to 15,000 GPM.

Send for Technical Supplement HM or for details on your application.

(Patented)

IN OUR 89TH YEAR

AMERICAN WELL WORKS

Mixing, Pumping, Water & Waste Treatment Equipment

150 N. BROADWAY, AURORA, ILLINOIS

Sales Offices: Chicago, New York, and other principal cities

When inquiring check 4526 opposite last page

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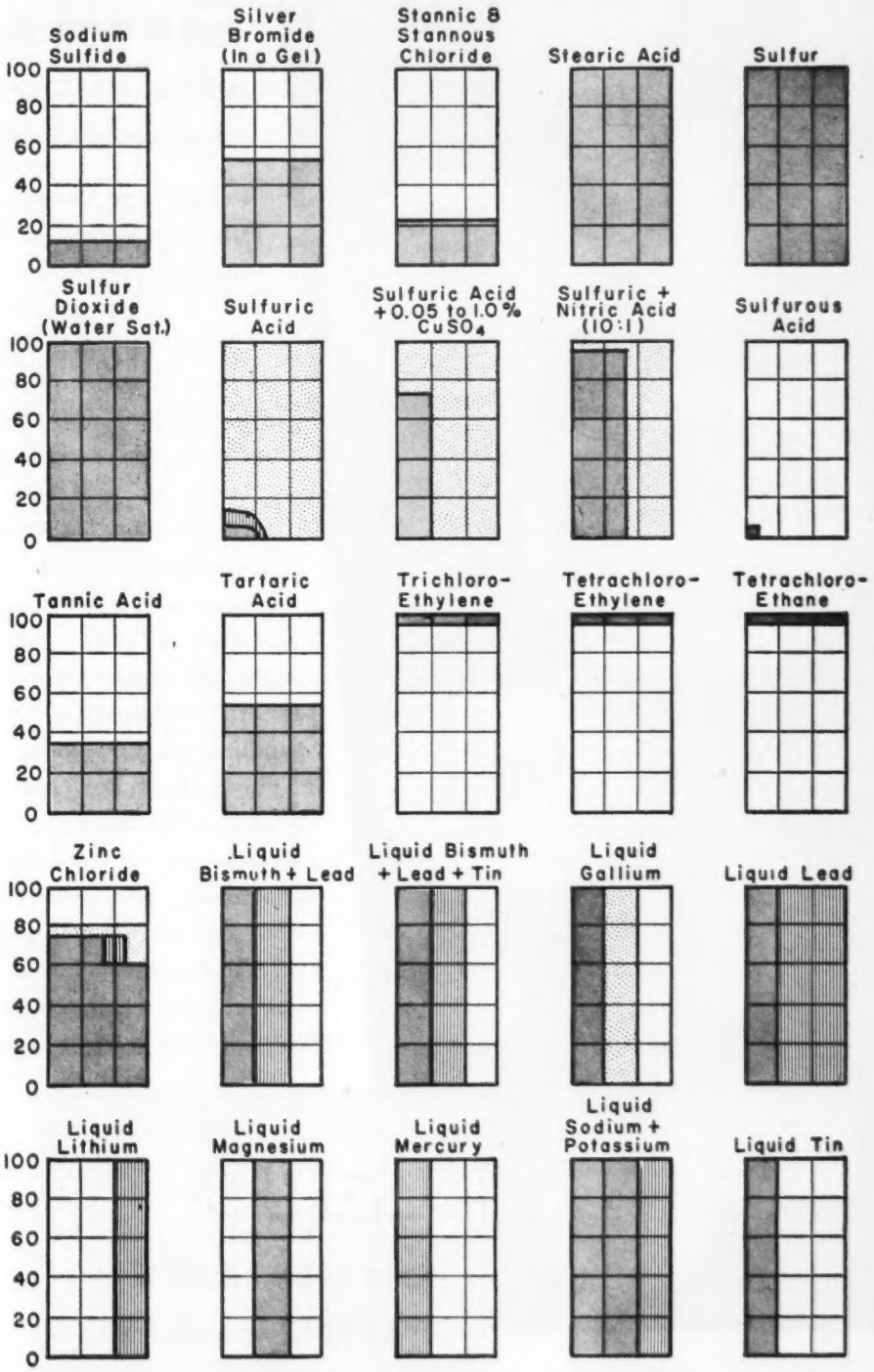
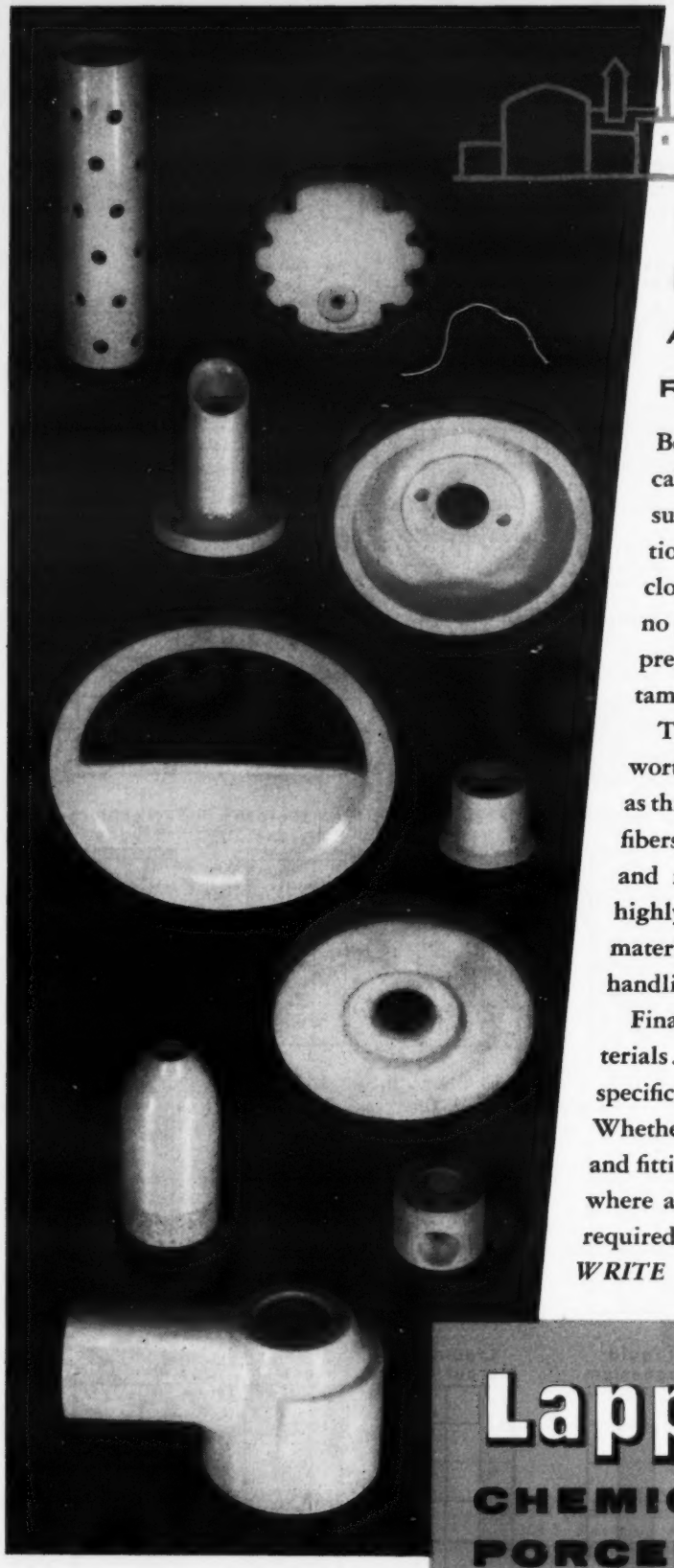
Less than 0.005 in/yr
0.005 to 0.020 in/yr
over 0.020 in/yr
Rate not determined or compound decomposes

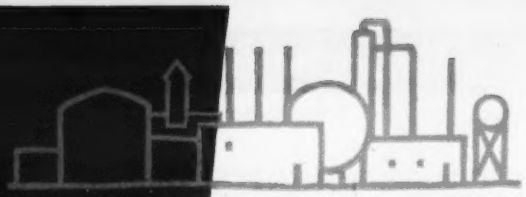
207

CORROSION KEYS: *Titanium*

Starts on page 67







LAPP CHEMICAL PORCELAIN FOR ACID AND ABRASION RESISTANT SURFACES

Because Lapp Chemical Porcelain is chemically inert, it is corrosion resistant and ideally suited for handling acids of all concentrations. It is pure, dense, hard, homogeneous, close-grained and non-porous so there can be no penetration—no crumbling from capillary pressures—no absorption of liquids to contaminate later processing.

The hardness of Lapp Porcelain proves its worth when used as a "running surface" such as thread guides or rolls for processing synthetic fibers or sheet stock . . . it cannot be scratched and raise a "burr." Since Lapp Porcelain is highly abrasion resistant, it becomes an excellent material for piping to carry off fly-ash; or for handling cement, pigments and abrasive slurries.

Finally, Lapp Porcelain uses low cost raw materials . . . it can usually be fabricated to customer's specifications for considerable dollar savings. Whether it be special sleeves, nozzles, tubes, pipes and fittings, trays, plates, grates or any other parts where acid and/or abrasion resistant surfaces are required, look to Lapp Chemical Porcelain.

WRITE for description and specifications. Lapp Insulator Co., Inc., Process Equipment Div., 326 Wendell St., Le Roy, N. Y.

Lapp
CHEMICAL PORCELAIN

When inquiring check 4527 opposite last page

Inhibitor protects steel and aluminum

Has high effectiveness at low concentration

Uses: Material can be used in paint or wax formulations to enhance protection given to metal by coating. Another application is in petroleum equipment for protection of pipelines, storage tanks, tankers and other equipment. It can be used in antifreeze compounds. Product can be also used in cleaners, polishes, and solvents to prevent container corrosion.

Features: Tests have shown the material to have high effectiveness at low concentrations, particularly under acid conditions.

Description: Inhibitor acts by forming a film on the surface that seals the metal against attack. Product is a tan-colored, viscous liquid with a sp gr of 0.96-1.00 at 20°/4°. Viscosity (stokes) is 10.5-11.5. Readily emulsifiable in water, inhibitor is soluble in acetone, ethanol, ethyl acetate, carbon tetrachloride, benzene, kerosene, gasoline, mineral oil, and ethylene glycol.

(Virco-Pet 20 corrosion inhibitor is product of Virginia-Carolina Chemical Corp., Dept. CP, 401 E. Main St., Richmond 8, Va. . . . or for more information check 4528 on form opposite last page.)

"Here we're employing isotopes to detect leaks . . ."

there's nothing like
Vulcathene®
for resisting acids and corrosion!

VULCATHENE *is a tough, horn-like polyethylene . . . practically unbreakable! Lighter than aluminum . . . . . easily put together with threaded couplings or socket welds (polyfusion*).*

*patent applied for

CORROSION
VULCATHENE definitely *does not corrode.* All surfaces remain smooth under extreme corrosive conditions.

CHEMICAL RESISTANCE
VULCATHENE *resists* all alkalies and most strong *acids.*

SOLVENT RESISTANCE
VULCATHENE is almost completely *insoluble* in all organic solvents at room temperatures.

WATER RESISTANCE
VULCATHENE has *resilient elasticity* that responds to freezing water and returns to original thickness.

We invite your request for more detailed information about Vulcathene equipment and installations.

American Vulcathene
625 SOUTH GOODMAN ST. ROCHESTER 2, NEW YORK
DIVISION OF THE NALGE CO. INC.

When inquiring check 4529 opposite last page

CUT HERE AND FILE

CORROSION KEYS

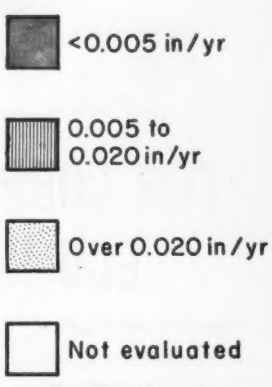
Zirconium *(Commercial grade)*

W. E. KUHN, Senior Engineer
Research & Development Division
The Carborundum Co., Niagara Falls, New York

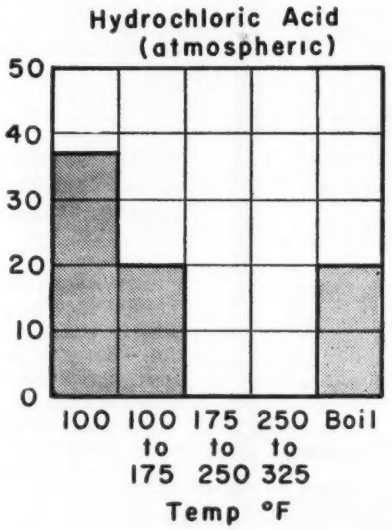
These data represent a summary of two series' of corrosion tests on commercial grade, double-arc melted zirconium. Commercial grade zirconium contains about 2% hafnium. One series of 144-hr tests was conducted at ambient atmospheric pressure up to the boiling points of the solutions, and the other for 48 hr at the equilibrium pressures of the solutions in sealed pyrex containers at temperatures up to 400°F. Test samples were 2 x ½ x 0.045" with 120 grit silicon carbide finish.

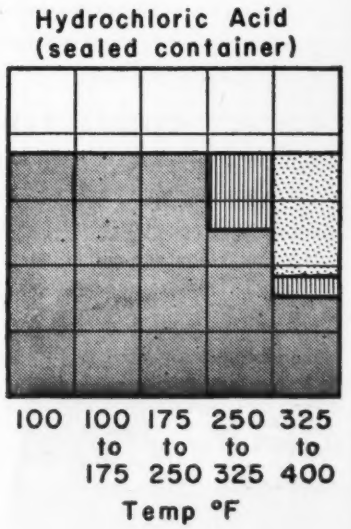
These Corrosion Keys are intended for rapid preliminary selection of materials. They are not intended to show what is best for a specific service. Manufacturer should be consulted for further information in regard to a given application.

(Further information on zirconium can be obtained from The Carborundum Metals Company, Inc., Dept. CP, Akron, N. Y. . . . or check 4530 on form opposite last page.)



Key: Corrosion rate in inches per year





"Corrosion Keys" are copyrighted (1957) *by Putman Publishing Company*

Turn to page 77

new FLUID TEFLON SHAFT SEAL

FOR CORROSION RESISTANT ECO ROTARY PUMPS

Here is a seal expressly designed for corrosive and hazardous service. It eliminates the usual pumping problems encountered with conventionally packed stuffing boxes or mechanical seals. Constructed of Carpenter 20 stainless steel throughout, it utilizes a fluid Teflon dispersion as a hydraulic sealing medium.

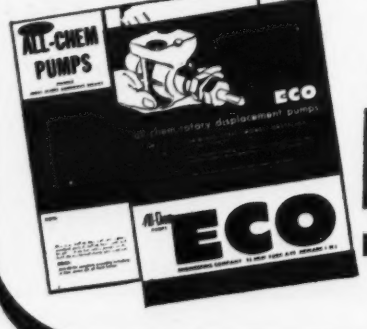
This seal is available from stock as optional equipment on all new pumps and can replace standard stuffing boxes on all existing Eco rotary pumps in the field.

LOW COST CHEMICAL PUMPS—DELIVERY FROM STOCK

Eco specializes in the manufacture of small corrosion-resistant pumps. These are available for immediate delivery with housings of 316 and Carpenter 20 stainless steel, Hastelloy C and Monel; impellers of Teflon, Hypalon, Neoprene and Formica.

Our engineering advisory service is at your disposal. Write or phone Eco on your pump problems. We'll be pleased to make specific recommendations.

SEND FOR ECO LITERATURE.



the big name in small pumps

ECO

ENGINEERING COMPANY

12 NEW YORK AVE., NEWARK, N. J.

When inquiring check 4531 opposite last page

Meters corrosives from barrels

Pump meters toxic or corrosive chemicals from upright, 55-gallon barrels against pressures to 100 psi. It is available in capacities from 500 ml per hour to 4 gph. Capacities are adjustable from zero to maximum. Repetitive pumping accuracy of pump is ± 1%.

Capacities of pump are adjustable from zero to maximum

(Barrel pump is product of Milton Roy Co., Dept. CP, 1300 E. Mermaid Lane, Philadelphia 18, Pa. Check 4532 on form opposite last page.)

Pipes, fittings, valves are custom molded from PVC, Buna-N

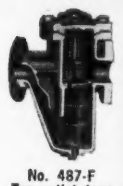
Complete line of products and services in rigid polyvinyl chloride custom-molded parts, pipes, fittings, valves, and tank linings, is now available from manufacturer of hard rubber equipment.

Recent developments in heat resistant Buna-N synthetic hard rubber have resulted in compounds with ASTM heat distortion temperature of 264°F. Pipe, fittings and valves are available in these hard rubber compounds on special order basis.

(PVC and hard rubber items are manufactured by The Luzerne Rubber Co., Dept. CP, Dewey St., Trenton 9, N. J. Check 4533 on form opposite last page.)

WITH OPW

line strainers



OPW

OPW Line Strainers remove dirt, scale, rust and other solids from liquids flowing in any pipe line system. This positive screening-out process protects and prolongs life of pumps, meters, loading valves, and mechanical equipment. Pipe-snug fit of cage and screen, plus larger than pipe size screen area, assures *free* and *complete* flow of product through strainer. Screens can be quickly and easily removed for periodic check-ups, cleaning and replacement.

Bulletin F-36 gives full details on sizes, styles, screen mesh, etc. Write today.

JORDAN CORPORATION

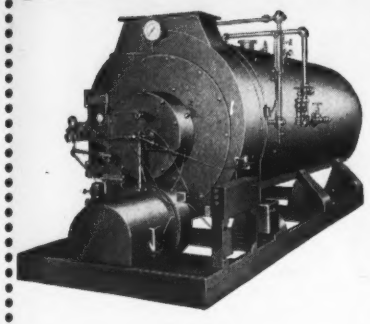
Division of OPW Corporation

6013 Wiehe Road Cincinnati 13, Ohio

ELmhurst 1-1352

When inquiring check 4534 opposite last page

CYCLOTHERM...
EASY to INSTALL
ECONOMICAL to OPERATE



Low-cost steam. You'll get a new idea of low-cost steam production when you install a Cyclotherm Steam and Hot Water Generator. It requires no costly stack—operates with a simple flue. It needs no special foundation or excavation. And since the Cyclotherm is up to one-third smaller than other package steam generators, it fits into the smallest possible boiler room space. Can be easily relocated in time of expansion.

Low operating costs. One maintenance man can take care of a Cyclotherm—parts are easy to get at, easy to clean. Burns gas and/or oil, with a quick changeover to whichever fuel is cheaper. Automatic controls save fuel by regulating firing rates to suit the need for steam.

A complete package. Cyclotherm is a complete package boiler, shipped ready to operate. Guarantees a minimum of 80% efficiency in two passes. For full information, write Cyclotherm Division, National-U.S. Radiator Corp., 29 E. First St., Oswego, N.Y. Models from 18 to 750 hp; 15 to 200 psi.

YEARS AHEAD IN STEAM GENERATION CYCLOTHERM
STEAM AND HOT WATER GENERATORS

Clip to Your Letterhead:

Please send me your free booklet, Cyclotherm Cyclonic Combustion

When inquiring check 4535 opposite last page

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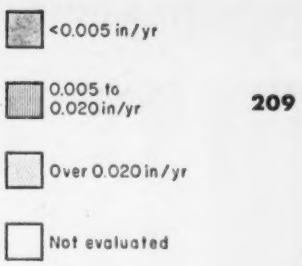
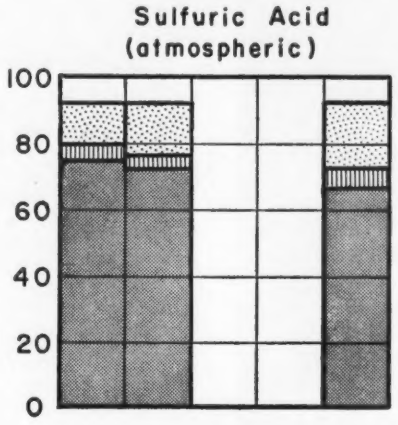
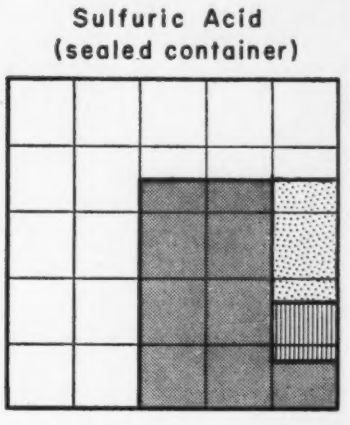
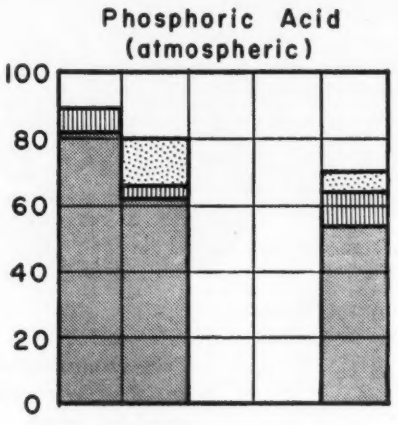
CORROSION KEYS: *Zirconium*

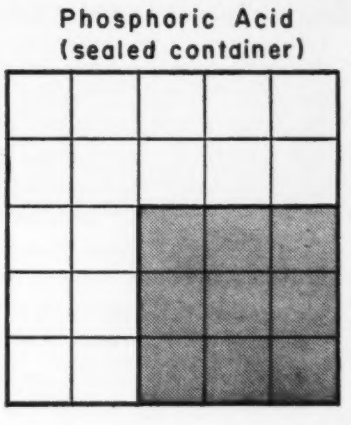
Starts on page 75

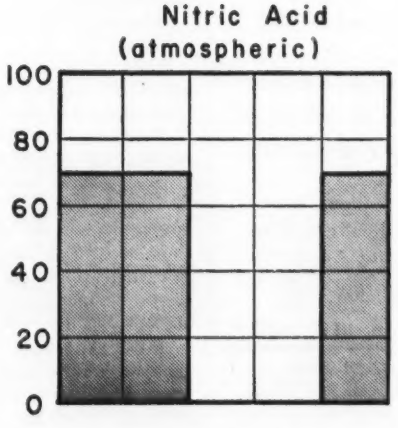


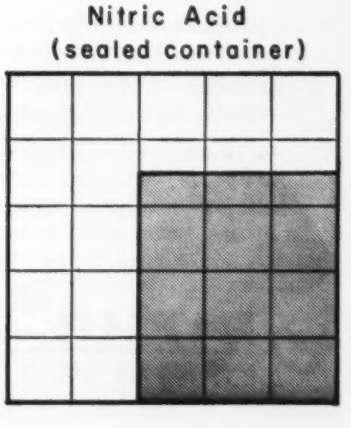




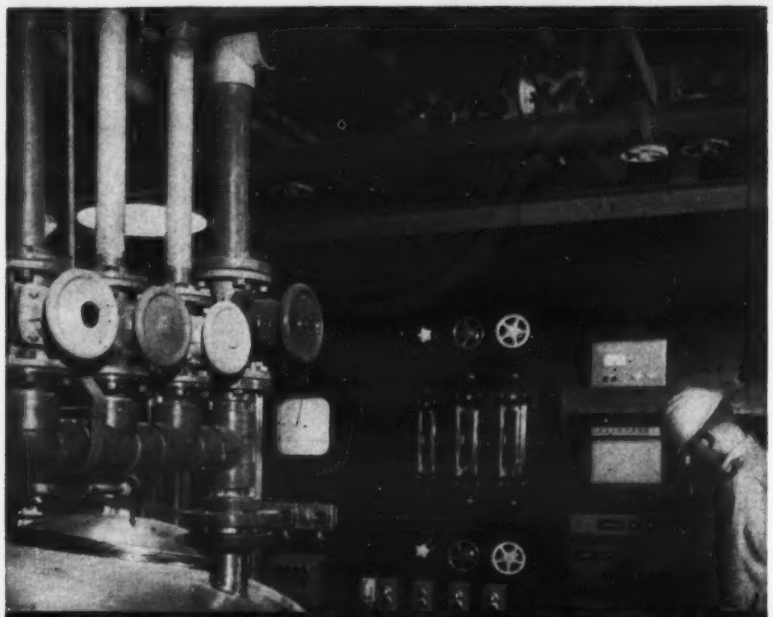








PVC PLASTIC PIPE COMES OF AGE



INSTALLED...OVER A MILE OF ALPHA RIGID PVC PIPE

REPLACED...OVER A MILE OF PIPE CORROSION HEADACHES

Process piping that won't corrode or introduce contaminants into the product is a must at the Reheis Company, Berkeley Heights, N. J., producer of fine bulk chemicals for the pharmaceutical and cosmetics industries. That's why Reheis installed a PVC package which includes:

1. 6200 feet of Alpha rigid PVC pipe.
2. 4930 Alpha PVC fittings.
3. 180 Alpha PVC valves.

There are a number of reasons why Alpha PVC has come of age at Reheis and other plants in the chemical process industries.

- **Corrosion Resistance**—Alpha PVC is inert to attack by the widest range of acids and alkalies of any material in the moderate price class.
- **Low Cost**—Alpha PVC package systems including pipe, valves and fittings, average less than half the cost of stainless steel.
- **Ease of Installation**—Only one-half the weight of aluminum, PVC pipe is assembled with cemented, screwed, flanged or welded joints.
- **Low Maintenance**—The corrosion resistance and high impact of PVC assures minimum maintenance.
- **Availability**—A large stock of pipe, valves and fittings up to 4 inches is available for immediate delivery.

For preventive maintenance, replace worn out piping systems with Alpha PVC and end your corrosion headaches.

Send for detailed literature on Alpha's line of PVC pipe, valves and fittings. Better still, contact our engineering advisory service. This service is available, at no obligation, to help solve your corrosion problems.

ALPHA PLASTICS INC. OKNER PARKWAY • LIVINGSTON, NEW JERSEY

INDUSTRIAL DISTRIBUTORS: territories available for Alpha's line of PVC pipe, valves and fittings.

When inquiring check 4536 opposite last page

Two stainless steels in tube and pipe

Alloys available in mill lengths to 20'6"

Manufacturer announces availability of two corrosion-resisting stainless steels in lengths of tube and pipe up to 20'6".

Alloy B is nickel-molybdenum-iron alloy with unusually high resistance to hydrochloric acid in all concentrations and at all temperatures. It also has strong resistance to boiling sulfuric acid, phosphoric acid, and wet hydrogen chloride gas.

Alloy C is nickel-molybdenum-chromium-iron alloy with excellent resistance to aqueous solutions of halogen salts, nitric acid, and acid solutions of ferric and cupric salts. It is also resistant to acetic, formic and sulfurous acids.

Both alloys, made of Hastelloy strip, are available in ⅝ to 4½" O.D. sizes in tube, and ¼ to 4" sizes in pipe.

(Alloy B and Alloy C tube and pipe are available from Alloy Tube Div., The Carpenter Steel Co., Dept. CP, Union, N.J. . . . or for more information check 4537 on form opposite last page.)

Salt-water corrosion resisted by metal used for pump

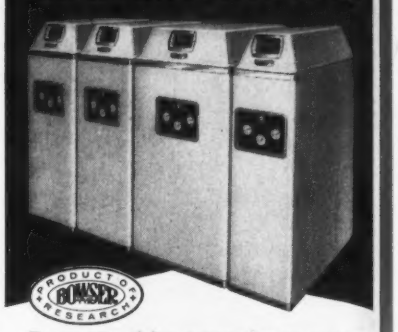
Cavitation tests show that aluminum bronze excels

Uses: Unit is designed for oil-field salt-water pumping and other corrosive uses.

Features: Lightweight alloy excels some metals in resistance to salt water corrosion by as much as 12 to 1, according to fresh- and salt-water cavitation tests. It is exceptionally tough, having impact strength of 20 to 30 IZOD.

Description: Aluminum-bronze centrifugal pump has resistance to abrasion with a Brinell hardness, as cast, of 190. Pump has suction and

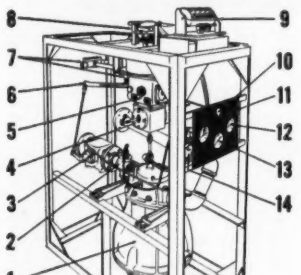
Blends many liquids automatically with unexcelled accuracy



Bowser precision proportioners automatically and accurately blend two or more liquids in closed, continuous production.

A simple setting of the percentage selectors provides any variation of blend from ½% to 100%. XACTO, "the world's most widely used meter," assures perfect proportioning of all liquids being mixed, compounded or blended.

SIMPLICITY OF DESIGN SAVES SPACE . . . REDUCES MAINTENANCE



1. Xacto Meter
2. Thermometer Well
3. Inlet Control Valve
4. Differential
5. Control Nut
6. Valve Control Arm
7. Pump Control Circuit & Switch
8. Selector
9. Indicating & Totalizing Dial
10. Flow Indicator
11. Inlet Pressure Gauge
12. Discharge Pressure Gauge
13. Dial Thermometer
14. Discharge Check Valve

DIALS FOR EVERY PURPOSE

Model K — furnishes printed record of quantity dispensed or received for accounting; Model P—delivers predetermined quantities up to 10,000 gallons; Model RP — delivers predetermined quantities, repeating each quantity automatically.

FREE OFFER . . .

Write for full color, 12-page Facts Folder titled, "XACTO PRECISION BLENDING SYSTEM."

BOWSER INC.
1315 E. CREIGHTON AVE.
FORT WAYNE, INDIANA

When inquiring check 4538 opposite last page

discharge connections in castings. Removal of casing cover permits interior of pump to be inspected or cleaned without disturbing any piping connections. Impeller may be removed or replaced without disturbing piping. Since stuffing box is on suction side of impeller, pressure on box is limited to suction head or pressure under which pump operates. This insures long packing life and freedom from excessive leakage. Provision is made for external adjustment of any clearance that might occur between impeller vanes and casing.

(Aluminum-bronze centrifugal pump is product of Goulds Pumps, Inc., Dept. CP, Seneca Falls, N.Y. . . . or for more information about manufacturer's product check 4539 on form which is located opposite last page.)

High abrasion resistance with flexibility achieved in coatings

Epoxy products resist wide range of chemicals

Uses: For a wide range of applications where resistance to corrosion is required.

Features: Coatings are flexible yet highly abrasion-resistant. They withstand a wide range of chemicals, including acids, alkalis, caustics, and solvents. Without softening or buckling under high heat and extreme humidity, coatings adhere firmly to wood, metals, concrete, plaster, paper, and plastics.

Description: Two recently developed epoxy coatings are available, a gray enamel and a clear varnish. Supplied with catalyzed thinners, both coatings attain hardness and thickness at room temperature.

(No. 750 gray enamel and No. V-760 clear varnish coatings are products of Marblette Corp., Dept. CP, 37-31 30th St., Long Island City 1, N.Y. . . . or for more information check 4540 on the convenient Reader Service slip located opposite last page.)

STRONGER and SAFER for every high pressure pipeline duty...

...because they are drop forged by Vogt

Send for Catalog F-9

OTHER VOGT PRODUCTS

Drop Forged Steel Valves — Petroleum Refinery and Chemical Plant Equipment — Steam Generators — Heat Exchangers — Ice Making and Refrigerating Equipment.

Constantly imitated but never duplicated, Vogt drop forged steel fittings and flanges have unmatched strength and toughness for your most severe pipeline duties. Laboratory controlled materials and Vogt's special forging techniques assure products which are always uniform in structure, fine grained and free from porosity. Thereby the shocks and stresses imposed by high pressures and high temperatures are easily withstood, and with stubborn resistance to erosion and corrosion. Consult Catalog F-9 for our complete line of fittings and flanges.

For a copy of Vogt Catalog F-9 address Dept. 24A-FCP.

HENRY VOGT MACHINE CO., P.O. BOX 1918, LOUISVILLE 1, KENTUCKY

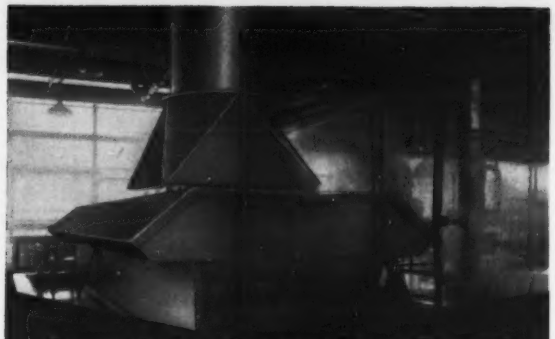
SALES OFFICES: New York, Chicago, Cleveland, Dallas, Philadelphia, St. Louis, Charleston, W. Va., Cincinnati

Vogt

DROP FORGED STEEL

Fittings and Flanges

When inquiring check 4541 opposite last page



Complete Corrosion Proof Plastic Ventilating and Exhaust Systems

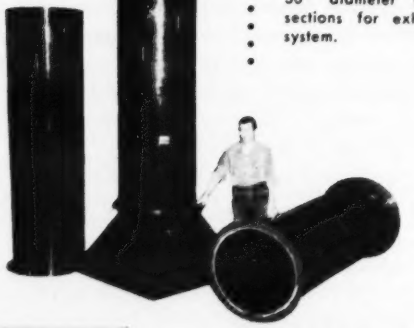
...engineered and built to specifications, save maintenance dollars ...cut downtime.

■ Wherever corrosive fumes must be handled, Agilide (PVC) or Agilene (polyethylene) exhaust and ventilating systems will do the job at far less cost. Made entirely of rigid and durable plastic, they afford complete protection from corrosion. There are no coatings to chip or peel — no weak spots and no metal parts to corrode.

Agilene (polyethylene) and Agilide (PVC) installations are widely used in the chemical and allied industries. They quickly pay for themselves by outlasting previously used materials.

Write for full details on Agilene and Agilide corrosive resistant exhaust systems . . . there are components to cover all phases of fume ventilation from the exhaust hood — to fan — to the weather cap above the roof.

Double lateral exhaust ducting of 6⅝" O.D. Agilene material, all welded construction to be attached to duct line. 30" diameter stock sections for exhaust system.



AGILENE AGILIDE

Acknowledged pioneers in the engineering and welding of structural plastics.

AMERICAN AGILE Corp.

5461 Dunham Rd. • Maple Heights, Ohio

When inquiring check 4542 opposite last page

Pump's advantage — low maintenance

Uses: For pumping fluids in chemical, beverage, and other industries.

Features: New design provides longer service life and reduced maintenance. Pump is corrosion-resistant. Side-mounted models are engineered, handling heavy viscous fluids.

Description: Positive-displacement sanitary pump has stainless steel shaft sleeve designed with slot that engages special positioning pin. This provides positive rotation of sleeve and shaft without sleeve slippage, and prevents wear and replacement of shaft. Load on impellers is brought closer to support bearings, eliminating shaft slap or excessive wear. Bearings are in separate chamber and are lubricated by force-feed principle. Larger diameter shaft, with larger splines, reduces wear and promotes smooth vibrationless operation. Reusable rubber oval ring fits machined slot in pump head, and provides complete seal against vacuums.

Stainless steel inserts, in pump body dowel holes, assure positive pump body alignment at all times. Vented-cover pumpheads, manually or pneumatically controlled, are available for applications where back pressures are problem. Pump sizes include any capacity from 0 to 100 gpm in gear head or V-belt drives.

(Positive-displacement pump is product of Waukesha Foundry Co., Dept. CP, Waukesha, Wis. . . . or for more information check 4543 on form opposite last page.)

Corrosion-resistant pipe

Construction and applications of chemically inert, fracture-proof pipe processed from Teflon resin and glass fiber are described in four-page bulletin. Bul FTL-2 — Resistoflex Corporation, Dept. CP, Roseland, N.J. . . . or for more information reader may simply check 4544 on form opposite last page.

POLYETHYLENE SINK TRAP

LANCO POLYETHYLENE SINK TRAP
P-Type, complete, ready to install, No. CP161-98, each . . . $33.75

- ***Chemical- and acid-resistant***
- ***Tough and flexible***
- ***Bowl unscrews by hand***

This P-type trap is several steps ahead of any other model polyethylene sink trap. Union connections to *both* sink outlet and drain line make this trap easier to install (see drawing). Because of its cup-type lock nut, it can be installed on thin gauge metal sinks or on thick stone sinks. Pipe on line side of outlet union is 1½" IPS, accommodating polyethylene insert adapters which easily connect to standard American size polyethylene pipe.

Write for data sheet on LANCO Polyethylene Sink Trap.

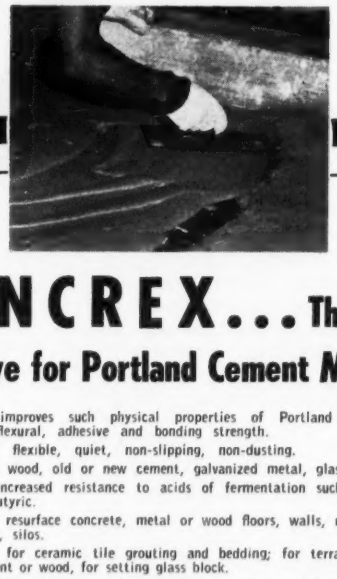
A data sheet on polyethylene pipe and fittings is also available.

LaPINE **ARTHUR S. LaPINE and COMPANY**

6001 SOUTH KNOX AVENUE • CHICAGO 29, ILLINOIS, U.S.A.

LABORATORY SUPPLIES • EQUIPMENT • REAGENT AND INDUSTRIAL CHEMICALS

When inquiring check 4545 opposite last page



CONCREX... The New Additive for Portland Cement Mortars

- Greatly improves such physical properties of Portland cement as tensile, flexural, adhesive and bonding strength.
- Resilient, flexible, quiet, non-slipping, non-dusting.
- Bonds to wood, old or new cement, galvanized metal, glass.
- Greatly increased resistance to acids of fermentation such as lactic, acetic, butyric.
- Patch or resurface concrete, metal or wood floors, walls, ramps, loading docks, silos.
- Excellent for ceramic tile grouting and bedding; for terrazzo topping over cement or wood, for setting glass block.
- High solids content—no unnecessary water—no special powders. Use locally acquired cement and aggregate.
- Economical—total material cost usually less than $.04 per sq. ft. for each 1/8" thickness.

Write for Literature

SARAN PROTECTIVE COATINGS COMPANY

2415 Burdette Ave. Ferndale 20, Michigan

When inquiring check 4546 opposite last page

Corrosion-resistant valves of chlorinated polyether

Inert polymer operates at temperatures to 250°F

Uses: For metering corrosive liquids and gases in radiation laboratories where close control and bubble-tight shut-off are required.

Features: Chemically inert polymer, known as Penton, is suitable for temperatures up to 250°F and pressures up to 170 psi. Valves are non-toxic and non-flammable.

Description: Valves are made of Penton chlorinated polyether and trimmed with Teflon, Kel-F, and 18-8 stainless steel. They are self-draining, with universal porting design permitting easy plug removal for cleaning while installed. Valves are immune to electrolysis and galvanic action. Low-friction "Quad-Ring" seals against Kel-F needle to produce virtually wear-proof seal for high or low pressure and vacuum conditions. Sizes range from ⅛ to ½" in female pipe threads, male pipe threads, tube connectors, hose connectors, offset straight through, and angle design. All valves are compatible with standard fitting and piping methods.

(Penton and PVC valves are product of Chemtrol Corp., Dept. CP, 1513 El Segundo Blvd., Compton, Calif. . . . or for more information check 4547 opposite last page.)

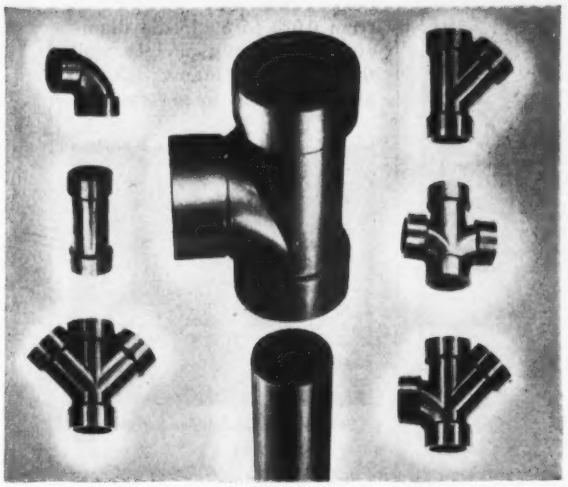
(Penton chlorinated polyether, is product of Hercules Powder Co., Inc., Dept. CP, 978 Market St., Wilmington 99, Del. . . . check 4548.)

Smokestack corrosion

How manufacturer's glass-lined steel smokestacks provide protection against corrosive flue gases is explained in eight-page bulletin. Chart compares cost differences between glass-protected and conventional stacks over 30-year period. Bul SS-202 — A. O. Smith Corp., Dept. CP, PO Box 584, Milwaukee 1, Wis. Check 4549.

PVC PIPING NEWS

PUBLISHED BY TUBE TURNS PLASTICS, INC. • LOUISVILLE 1, KENTUCKY



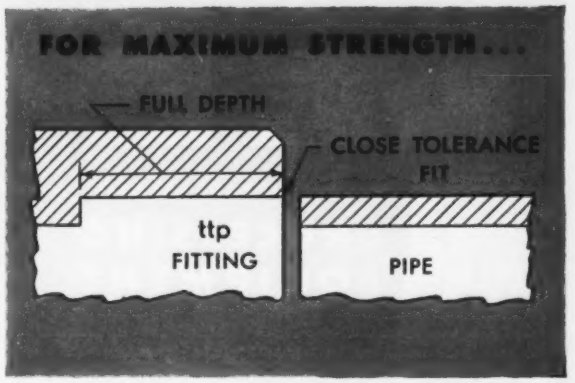
New drainage fittings offer big savings

Tube Turns Plastics announces a new line of PVC drainage fittings for carrying away corrosive waste liquids. Compared to cast alloys normally used, they cut labor and materials costs drastically. Can make solvent-cemented joints in about ¼ usual time. Available in all standard types . . . sizes 1½" through 4".

Extensive tests prove superiority of ttp solvent-cemented joints

Tube Turns Plastics has completed thousands of tests to show how maximum strength and joint-cementing speed are assured with **ttp** socket type fittings and solvent cement. Findings:

1. Full-Depth Socket. Strength of any PVC solvent-cemented joint depends on *area of contact*. Tube Turns Plastics was the first company to offer a complete line of socket-cemented PVC fittings having full depth of sockets providing areas of contact such that the joints are stronger than the fittings or pipe of same rating, when easily learned cementing technique is properly employed.



2. Socket bore tolerances are designed to avoid "interference fit" with pipe as normally made, yet provide more than adequate joint strength. Slowing down of joint making is thus minimized and overstressing fitting is avoided.

3. Close-Tolerance Fit. I.D. of fitting matches O.D. of pipe as closely as possible to provide 100% joint efficiency with normal tolerances of pipe. "Interference fit" not desirable with PVC.

4. Strongest joints secured with **ttp** solvent cement, proven by leading users of PVC piping. This cement is *pure PVC* in solvent.

The full line...nearby

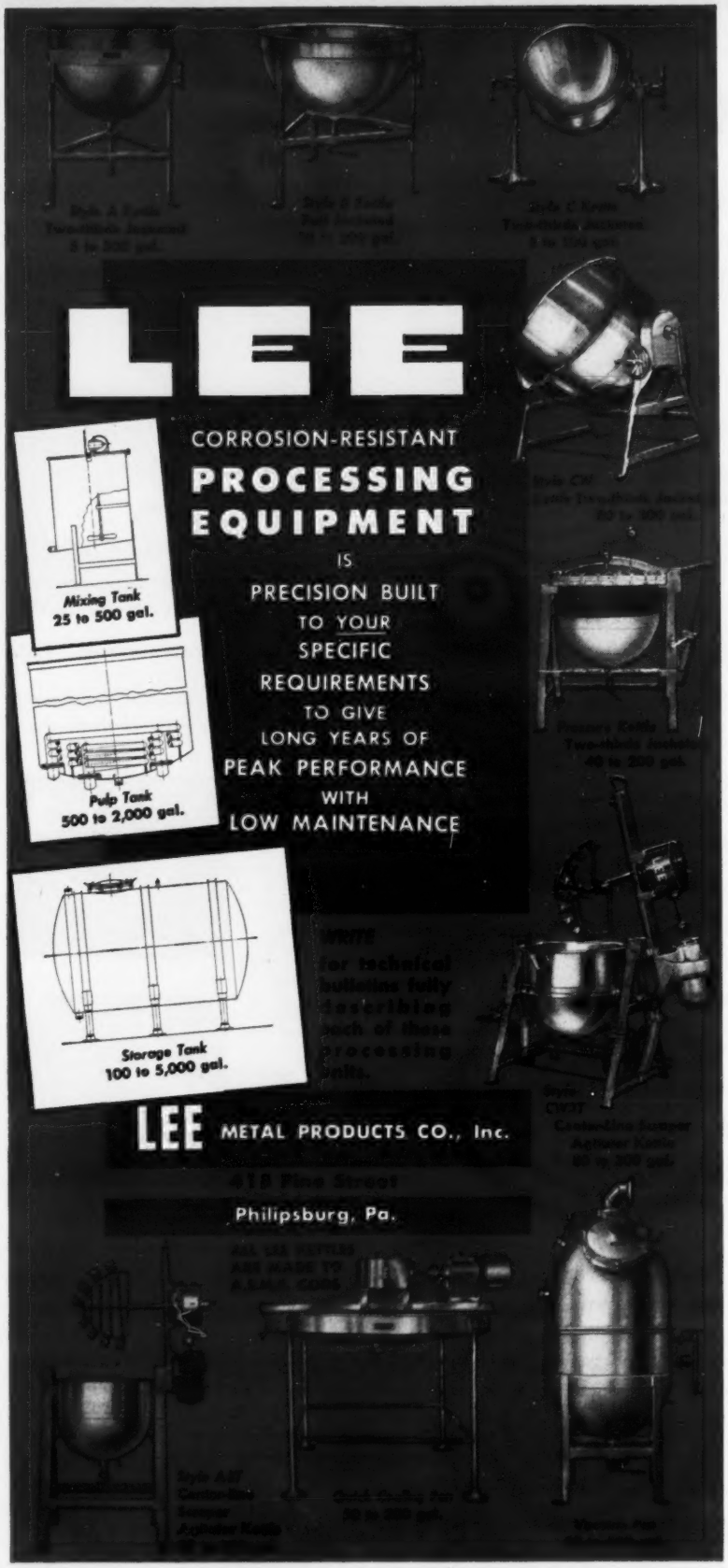
Your Tube Turns Plastics' Distributor can deliver promptly from the complete line of **ttp** injection molded fittings, flanges and valves . . . in sizes ½" through 4". . . threaded and socket type . . . normal and high impact PVC . . . as well as solvent cement and thread lubricant. This one source can meet *all* of your requirements. Write for Bulletin TTP 119.

Leading Manufacturer of Injection Molded Polyvinyl Chloride Pipe Fittings, Flanges and Valves

TUBE TURNS PLASTICS, INC.

Dept. TTP-6, 2929 Magazine St. • Louisville 11, Kentucky

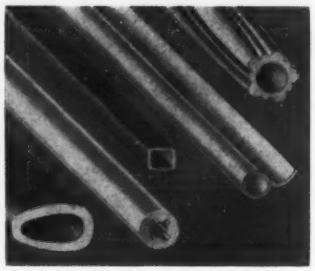
When inquiring check 4550 opposite last page



When inquiring check 4551 opposite last page

Extruded plastic tubes and hollow shapes are available

Extruded plastic tubes and hollow shapes made to exact specifications are now available. Tubes may be specified from 0.020 to 3″ inside diameter with heavy or thin wall thicknesses. Hollow shapes are obtainable in several different designs. Special surface effects such as ribs, beads, or flutes can be furnished. All of these can be obtained in rigid, flexible, hard, or soft materials in many colors and crystal clear.



Several typical tubular extrusions

(Extruded plastic tubes and hollow shapes are products of Anchor Plastics Company, Inc., Dept. CP, 36-36 36th Street, Long Island City 6, N. Y. . . . or for more information check 4552 on form opposite last page.)

Finish retains its gleam on high-temp surface for three years

Former coatings failed quickly at 300 to 900°F

Problem: Keeping a gleaming silver finish on surfaces at 300 to 900°F was an expensive maintenance proposition at Cosden Petroleum's refinery in Big Spring, Texas. Keenly aware of public relations value of this scenic highspot on the west Texas plains, Cosden finished entire refinery in bright silver and gold, with gleaming red, green, and black trim.

No conventional finish could withstand surface tempera-

To see what's going on inside

When you want to look into a furnace, watch acid eat its way into metal, observe a white hot melt in cool comfort, there's only one answer . . . GLASS.

PYREX brand PLATE GLASS No. 7740 is particularly suited for odd-sized sight glasses, fume duct windows, and chemical-resistant surfacing. You can use it for temperatures up to 900° F. It is resistant to thermal shock and indifferent to chemical attack.

VYCOR brand FLAT GLASS No. 7900 has such resistance to thermal shock that you can use it with continuous temperatures to 1450° F., intermittently at 2210° F.; for high-temperature furnaces and tanks.

PYREX brand INFRARED-REFLECTING GLASS reflects radiation in the infrared spectrum but transmits up to 75% of visible light. Useful as an efficient shield to protect workmen from exposure to intense heat radiation.

CORNING HEAT-RESISTANT BLUE OBSERVATION GLASS, reduces glare when observing flame, smoke and ash intensity in power plants, marine boiler stations and the like.

Let us send you a copy of Bulletin PE-34 which describes the properties, specifications, and applications of these Corning Flat Glasses.

Corning means research in Glass

CORNING GLASS WORKS
CORNING, N. Y.

Please send me a copy of your Flat Glass Bulletin PE-34.

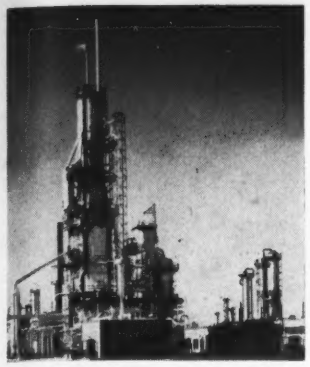
Name .....

Company .....

Address .....

City ..... Zone ..... State .....

When inquiring check 4553 opposite last page



Silicone-aluminum finish helps make Cosden refinery a west Texas scenic highspot

tures on stacks, furnaces, crackers, and similar units. Several expensive repaint jobs were required every season.

Solution: In the spring of 1953 Cosden applied a silicone-aluminum finish to their sky-scraping catalytic cracker. Finish was formulated by Cactus Paint Co., Big Spring, Texas.

Results: Three years after application silicone-aluminum coating has retained more of its original gleaming appearance than former finish did after three months.

Savings in maintenance have more than paid for silicone finish. As a result Cosden now specifies this coating for all equipment in high-temperature service.

(Silicones for heat-resistant finish were supplied by Dow Corning Corp. Dept. CP, Midland, Mich. Check 4554 on form opposite last page.)

"He's the company's last effort to solve its corrosion problems."

WHEN YOU SPECIFY "FLEXITALLIC"

There is something unique about Flexitallic Spiral-Wound Gaskets, the result of more than 45 years in gasket design and construction. At Flexitallic . . .

Compression response of the gasket is directly related to bolting for each application;

With the desired gasket design determined, exacting mechanical controls assure that manufactured gaskets conform to specification.

That is why more and more engineers insist on *Flexitallic* Spiral-Wound.

Flexitallic Gaskets are designed to meet specific conditions of pressure, temperature, thermal shock, chemical attack and cyclic operation. Spiral-Wound V-crimped plies of required metal with alternating plies of proper filler result in a gasket with compression characteristics like those of a precalibrated spring.

Flexitallic Gaskets — for pressure/temperature ranges from vacuum to 10,000 lbs. from sub-zero to 2000° F. For all standard joint assemblies.

FLEXITALLIC GASKET CO.
8th & Bailey Sts., Camden 2, N. J.
Representatives in principal cities

Flexitallic®
SPIRAL-WOUND GASKETS
FOR PIPE FLANGES, PRESSURE VESSELS AND PROCESS EQUIPMENT

*Flexitallic is a registered trade name. No one else can make a Flexitallic Gasket. Look for *Flexitallic Blue*—it's our exclusive blue-dyed Canadian asbestos filler.

When inquiring check 4555 opposite last page

DEKORON PRODUCTS CUT INSTRUMENT TUBING COSTS

EASY-TO-INSTALL
INSTRUMENT
LINE HARNESS

DEKORON Poly-Cor is a tried and proven instrument tubing bundle having advantages of light weight, corrosion resistance and extreme ease of installation.

It is completely color-coded with 7 colors of tubing so placed in the bundle that each tube is easily identified by its relation to the other colored tubes. Their natural resiliency resists physical damage. Harness composed of from 2 to 37 (19 *illustrated*) individual lines is available.

Initial cost . . . installation . . . corrosion resistance . . . maintenance—*no tubing can compare with patented Dekoron Poly-Cor.*

Request Bulletin 456.

Use Dekoron E-Z Tube Fittings. Specifically designed for use with Poly-Cor or with single-line plastic Dekoron "P" Tubing.

AA-4804

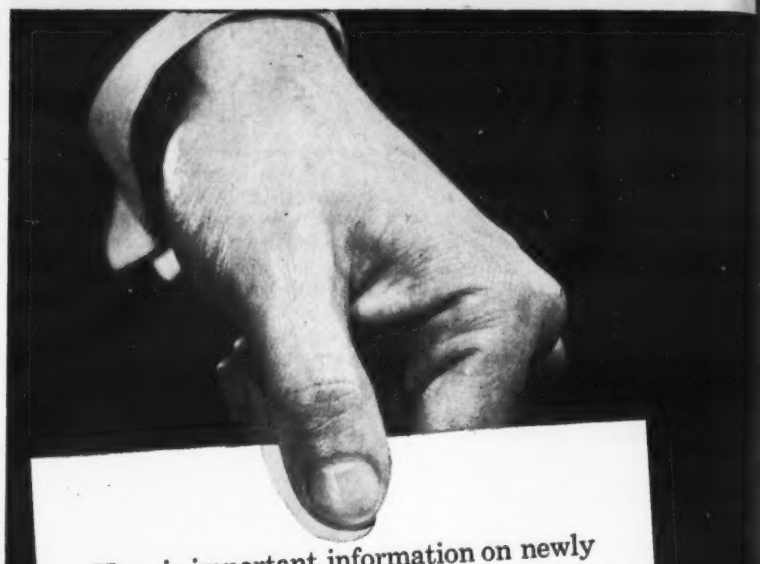
Dekoron® products

quality
research
service

SAMUEL MOORE & COMPANY • MANTUA, OHIO

DEKORON PRODUCTS DIVISION

When inquiring check 4556 opposite last page



Here is important information on newly developed corrosion resistant fume ducts and fume hoods for the handling of vapors from virtually any chemical.

We have proudly named the new material

DURACOR

Fabricated from specially compounded thermo-setting plastics which are combined with glass and other synthetic fibers, Duracor hoods, ducts, tanks and process equipment can be supplied in almost any shape. Chemical resistance, lightweight, strength, easy workability as well as attractive appearance are only some of the features.

Duracor shapes can have tensile strength up to 15,000 psi and flexural strength up to 30,000 psi. Duracor is chemically inert throughout its thickness. Linings for interiors and coatings for exteriors are completely eliminated.

Why not write today and get complete details. We welcome your inquiry and will give it immediate attention. Send your request to The Ceilcote Company, Inc., 4834 Ridge Road, Cleveland 9, Ohio.

DURACOR is another development of CEILCOTE!

7522-CC

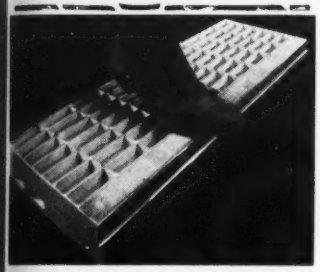
When inquiring check 4557 opposite last page

Aluminum stair treads resist corrosion

Uses: For use in industries where stairs are subject to extreme weathering or corrosive atmospheres.

Features: Tread answers demand for economical step for corrosive environments. Special aluminum alloy insures high corrosion resistance and strength, affording long, maintenance-free life.

Description: Aluminum stair tread grating is cast in one piece so that concentrated loads are distributed more evenly over all bearing bars. Slip-proof abrasive nosing is used. Rounded, joint-free corners prohibit collection of dirt.



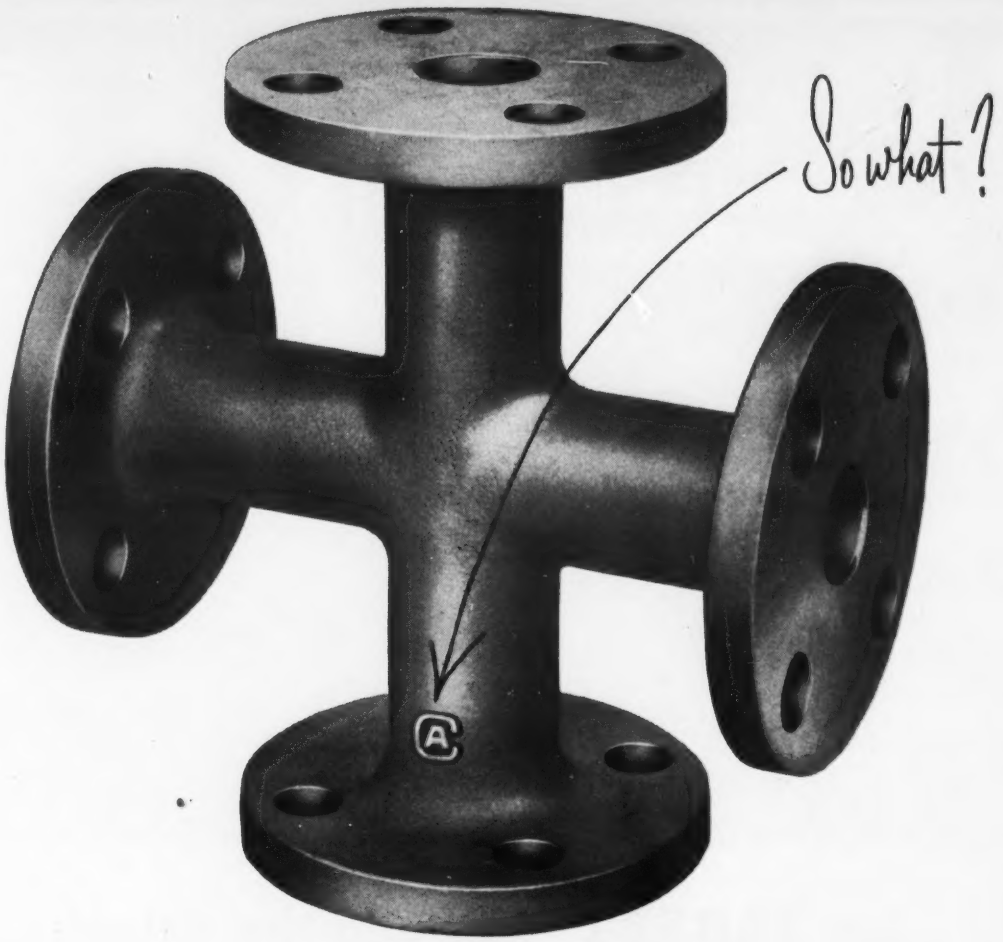
One-piece aluminum stair tread is designed to resist corrosion and provide safer footing

Although designed to carry weight of heavy man, stair has withstood loads in excess of 3000 lb.

(Aluminum stair tread is product of Aluminum Company of America, Dept. CP, 1501 Alcoa Bldg., Pittsburgh 19, Pa. . . . or for more information check 4558 on form opposite last page.)

Rust inhibitive coating system

Booklet of 24 pages describes coating system for inhibition of rust in which a lead silico chromate pigment is used. Featuring four pages of paint formulations, booklet includes specifications, properties, pigment description, and recommendations for use. "Defense in Depth" — National Lead Co., Dept. CP, 111 Broadway, New York 6, New York. Check 4559.



There's a good reason for the Ⓐ trademark on our

STAINLESS STEEL FITTINGS

Behind the Cooper Alloy trademark stands more than *a quarter century of experience* in the manufacture of stainless steel fittings...and every year of this experience is reflected in completeness of line, soundness of design, quality of workmanship and availability of the product.

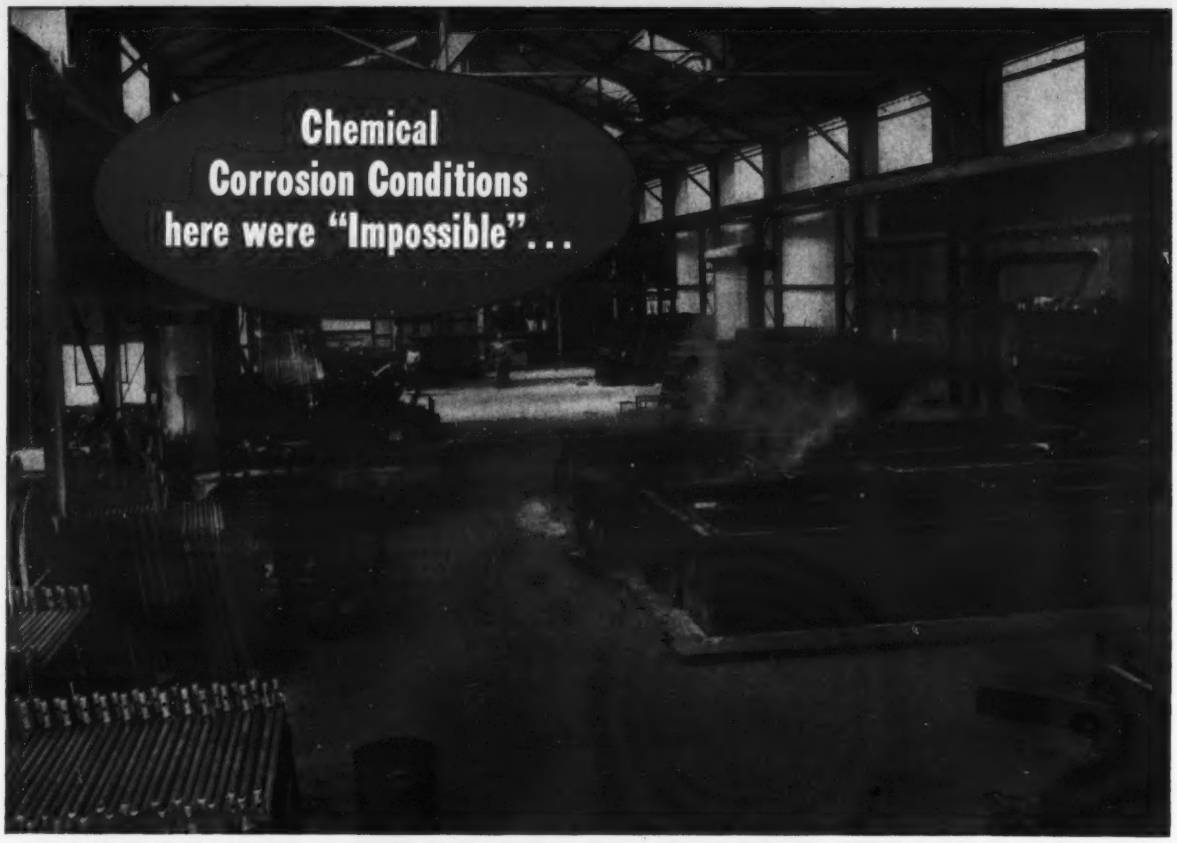
Regularly stocked in types 304, 316, 347 and FA20, and available on short delivery in the extra low carbon (ELC) grades as well as in nickel or monel, the Cooper Alloy line is sold and serviced by industrial distributors, mill supply houses and piping distributors with branches and warehouses in key cities. Backed up by a network of regional representatives, sales engineers and the most intensive continuing research program in the industry, these distributors offer maximum service and fast delivery.

Every step in production, from the original design through the patternmaking, coremaking, molding, melting, heat treatment, pickling, machining, testing and shipping is under the direct control of Cooper Alloy stainless steel specialists. Look for the CA trademark before you buy . . . It's a sign of quality, experience and reliability.

Catalog 55F available on request.

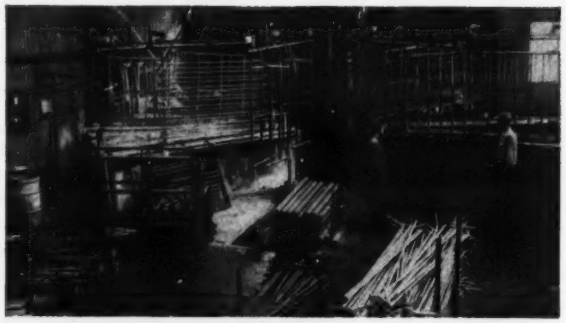
COOPER ALLOY CORPORATION
Valve and Fitting Division • HILLSIDE, N. J.

When inquiring check 4560 opposite last page



But TARSET® Stopped the Attack!

The extreme corrosion conditions found in this metal finishing plant are seldom surpassed! Pickling and plating equipment, as well as structural steel, is under constant attack from fumes and spillage of sulphuric, nitric and chromic acids and cadmium and zinc salts. After several other protective materials failed, Pitt Chem *Tarset* was applied and stopped corrosion in its tracks.



This automatic rotary plater is protected from corrosion with Pitt Chem Tarset.

No other protective coating on the market today offers you the broad corrosion-resisting properties and relatively low cost of this unique and patented Coal Tar-Epoxy Resin coating.

Wherever the going is roughest—on storage tanks, precipitator tanks, material conveyors and similar chemical plant equipment—you'll find *Tarset* is the recommended coating.

If you have a stubborn corrosion problem that you've labeled as economically "impossible" to control, it will pay you to investigate *Tarset*. Send today for complete technical data and samples for testing.

COAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

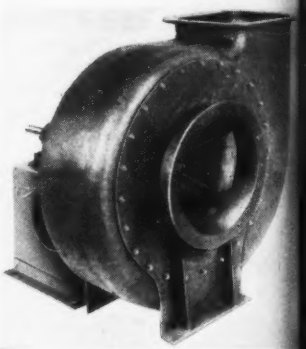
When inquiring check 4561 opposite last page

Fans are resin-bonded glass fiber

Uses: For severely corrosive air-handling jobs.

Features: Resin-bonded glass fiber is fire-resistant, lightweight, and resistant to wide variety of corrosives in applications up to 225°F.

Description: Glass fiber fan housing has integral stainless steel studs molded-in for attachment to bearing stand. Rotor is carefully balanced



Corrosion-resistant, fire-resistant, resin-bonded fiber glass fan offers versatility, light weight

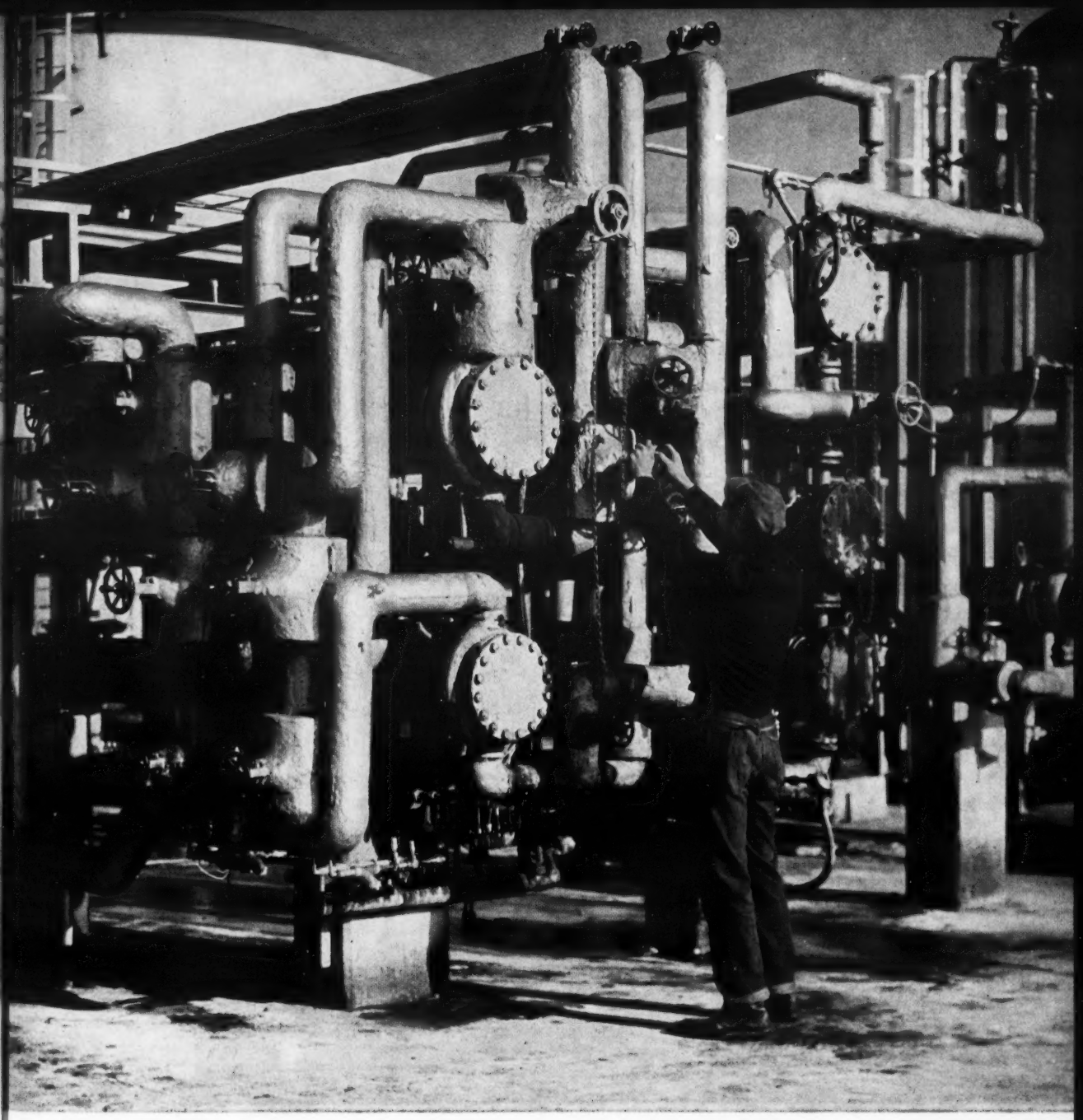
steel wheel with all exposed parts encased in thick fiber glass. Fans available in standard capacities to 34,000 cfm at pressures to 10" static.

(Type "FG" fan is product of Buffalo Forge Co., Dept. CP, 490 Broadway, Buffalo, N. Y. . . . or for more information check 4562 on form which is located opposite last page.)

Pipe made from Teflon and glass fiber

Design, construction, and typical applications of chemically inert, fracture-proof, pipe processed from Teflon resin and glass fiber are described in four-page bulletin. Bul FTL-2 — Resistoflex Corp., Dept. CP, Roseland, N.J. Check 4563.

For more information on product at right, specify 4564 . . . see information request blank opposite last page.



Easy way to keep tall oil moving: Aloyco jacketed valves

You're looking at a portion of the recently completed tall oil fractionation plant Foster Wheeler built for Union Bag-Camp Paper Corporation near Savannah, Ga.

The jacketed Aloyco stainless steel valves (with red hand wheels) get quite a workout in the two stage fractional distillation process here. Rosin and an intermediate fatty acid are produced in the first stage. Then the fatty acid is rerun through the main fractionating tower to produce a refined product for the manufacture of high grade alkyd resins, processing oils, soaps and chemical intermediaries.

Completely jacketed Aloyco valves are designed to ease handling of tars, tar oils, rosins and other materials difficult to move at room temperature.

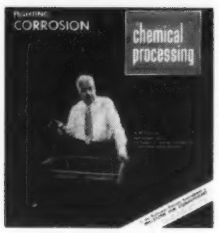
Aloyco's integrally cast, completely jacketed valves insure long life and low maintenance in high temperature corrosive service. For more information, write Alloy Steel Products Co., 1301 West Elizabeth Ave., Linden, N. J. 7.1

ALLOY STEEL PRODUCTS CO., LINDEN, NEW JERSEY

PRESENTING THIS NEW

"Executive Size"

OF CHEMICAL PROCESSING MAGAZINE



Have you noticed? . . . this issue of CHEMICAL PROCESSING is *different*. Lay this copy alongside an earlier issue of CP . . . compare them. Hold the new issue in your hands . . slip it into your brief case. It "fits" . . . it invites easy reading . . . for busiest-of-all chemical executives.

IT NAMED ITSELF . . . "The Executive Size"...

for as one of our editors said when it was in the planning stages, "This really *is* a magazine for executives!"

THUS AN EARLIER ORIGINAL DESIGN IMPROVES . . .

Nineteen years ago Putman Publishing Company created the original design for business magazines known as "King Size" . . . bringing theretofore unknown visibility and greater effectiveness in editorial presentation (yes, for advertising too).

Scores of other magazines adopted this format, and use it today.

Now, the "Executive Size" brings you new advantages . . . while retaining the best of the old.

Turn to page 40. Look at the unusually effective presentation of the editorial matter . . . the "cinemascopic" wide-screen layout.

Leaf anywhere through the magazine . . . editorial material *everywhere* . . . front and back. No solid sections of advertising pages . . . newspaper-width editorial columns invite easy reading throughout.

We think you'll find the new "Executive Size" of CHEMICAL PROCESSING easier to read, more interesting. But what do you think? Our first interest is the reaction of our readers . . . and we'll welcome any comments you'll care to make.

All Putman magazines now appear in this new "Executive Size" . . . FOOD PROCESSING, FOOD BUSINESS, INDUSTRY POWER, as well as CHEMICAL PROCESSING.

Russell L. Putman

Publisher and President

Stainless steel thermostat designed for corrosives

Specially suited for service in 5% H_2SO_4 up to 120°F

Uses: For corrosive applications with acetic acid vapors, halide solutions, alkaline solutions, and other materials to which 316 stainless is resistant.

Features: Unit is especially suited for service in 5 percent H_2SO_4 at temperatures up to 120°F. It will provide excellent service in all types of photographic solutions.

Description: Thermostat is fabricated entirely from 316 stainless steel. All exterior joints are heliarc welded. Unit is supplied with coupling-head mounting having pipe thread for direct threading in-

Stainless steel thermostat for corrosive environments

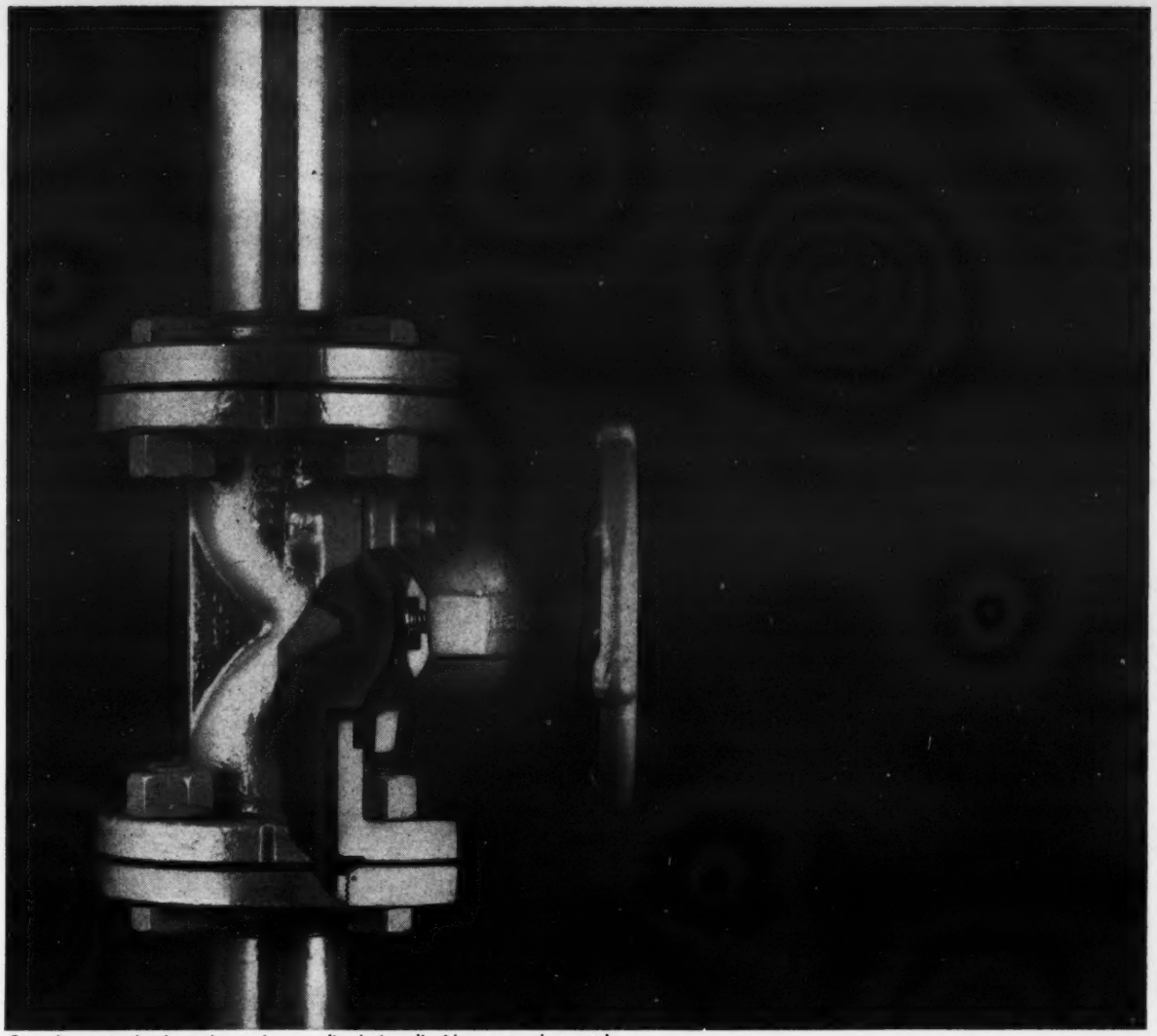
to tank or pipe wall. Contacts open above control setting.

Control temperatures are adjustable over range of -100 to 400°F. Short-time overshoot by as much as 100° will not affect reliability. Thermostat will control within 2°F in well-designed system.

(Thermoswitch is product of Fenwal Incorporated, Dept. CP, Ashland, Mass. Check 4565 opposite last page.)

Titanium—the metal and it uses

Technical article of seven pages by Chester Anderson, Field and Corrosion Engineer, is on commercial applications of titanium. Article emphasizing corrosion-resistance properties of the metal is contained in manufacturer's publication. "Valve World", No. Four — Crane Co., Dept. CP, 836 S. Michigan Ave., Chicago 5, Ill. Check 4566.



Corrosion protection is continuous in saran lined pipe—liquid never touches metal.

You can see why Saran lined pipe prevents corrosion

Corrosive liquids never touch the rigid steel pipe . . . it's lined with durable saran

You can stop downtime and other corrosion-caused losses by using saran lined pipe.

The saran liner, over which is swaged a steel pipe, gives complete protection from commonly used acids, alkalies and many other corrosive liquids. At no time do these liquids touch the rigid steel pipe, its fittings or valves.

You'll like the labor-saving way it fabricates. Cutting and threading can be done in the field with conventional hand or power tools. And you can hang it in the same manner as ordinary steel pipe.

Saran lined pipe has high bursting strength, withstanding working pressures up to 300 psi. Fittings and valves are available in cast iron or malleable iron for 150 psi working pressures and in cast steel for 300 psi working pressures.

For tomorrow's protection today, investigate saran lined pipe. THE DOW CHEMICAL COMPANY, Midland, Michigan.

SARAN LINED PIPE COMPANY
DEPT. SP1593B-1
2415 BURDETTE AVENUE
FERNDALE 20, MICHIGAN

Please send me information on saran lined pipe, fittings and valves.

Name_____ Title_____ Company_____

Address_____ City_____ State_____

YOU CAN DEPEND ON DOW

When inquiring check 4567 opposite last page

STAINLESS STEEL

TYPE G.I. FANS

CORROSION-RESISTANT

...for handling materials and hot gases in chemical and process industries...

- **Type 304, 316 or 347 Stainless**
- **Heavy Construction**
- **Reversible and Rotatable**

Corrosion of air handling equipment in chemical and process industries is all too frequent. The ***nyb*** Stainless Steel General Industrial Fan resists injurious fumes while operating at top efficiency at temperatures up to 800°F. Other protective surfaces available for mild, low temperature conditions include paints, coatings such as resins and phenolics, and complete vulcanized rubber lining that cannot bubble, peel or tear away.

Send today for bulletin 521, and indicate particular conditions or problems present.

nyb THE NEW YORK BLOWER COMPANY

SALES OFFICES: 3159 SOUTH SHIELDS AVENUE • CHICAGO 16

For more information on product at left, specify 4568 see information request blank opposite last page.

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BETTER PROTECTION FROM CORROSION CAUSED BY

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JULY

when the
HEAT'S ON
LAYBOND *HYPALON BEST

Many of today's high temperature chemicals, strong oxidizing acids and solutions need the protection found in Laybond Hypalon linings — the linings that protect at temperatures of 150° to 200°F. and higher where many other elastomers have limited service ability. Laybond Hypalon linings offer excellent resistance to such chemicals as sulfuric acid, chromic acid, chrome plating baths, pickling baths, chlorine dioxide, bleaching solutions and nitric acid.

Call on us when you need this new lining or other corrosive resistant lining for storage tanks, processing tanks, ductwork and pipe.

Write for our new free bulletin LH

RUBBER LININGS FOR:
STORAGE TANKS
PROCESS TANKS
AGITATORS
PIPE AND FITTINGS
DIAPHRAGM VALVES

*Reg. U.S. Pat. Off. by DuPont

ACME-FISHER DIVISION
A LINING FOR EVERY PURPOSE
BROADWAY RUBBER CORP.
730 S. 13th St. — Louisville 2, Ky.

When inquiring check 4569 opposite last page

BETTER PROTECTION FROM CORROSION CAUSED BY • ACIDS • CAUSTICS • MOISTURE • ALKALIES • SALT SPRAY • WATER • WEATHER ELEMENTS

KERPON
PROTECTIVE COATINGS

Formulated of the sensationally successful EPOXY RESINS

PROVEN SUPERIOR performance in actual use under most extreme corrosion conditions — as container and pipe linings — as product and equipment finishes.

PROVEN SUPERIOR in resistance to practically all natural and chemical corroding elements including many acids.

PROVEN SUPERIOR in flexibility, color and gloss retention, long life and positive adhesion to most metals including iron and steel.

PROVEN SUPERIOR in reducing costly deterioration, replacement maintenance and customer complaints.

For a faster, low cost solution to YOUR corrosion problems write —

KERR CHEMICALS, INC.
BOX 89-P PARK RIDGE, ILLINOIS

• INTERIOR OR EXTERIOR •

When inquiring check 4570 opposite last page

Corrosion Trends

Starts on page 38

pipelines to decrease corrosion. These are polar compounds which produce either a large basic or large acid radical on hydrolysis.

In the field of protective coatings, every year adds more conclusive evidence that good surface preparation — the best under conditions prevailing — should always be specified and vigorously required. Sandblasting is now almost universally preferred.

A favorable reception and great interest is being shown in epoxy/coal tar formulations for cold application to pipe lines and other surfaces. Rapid curing results with catalysts. A need has existed for cold-applied coatings which, used with a suitable wrapper such as glass fiber, can be applied at couplings and fittings and will set up in a few hours to a satisfactory hardness.

Epoxy/coal tar products are finding use in this field. It is reported that this combination resists higher temperatures than regular coal-tar enamels. Also, extreme toughness and chemical resistance of coating makes it suitable for many severly corrosive applications.

Amine-cured epoxy coatings are reported to have given good protection to piping used for transporting oil. Short-service results indicate that this material compares favorably with baked-on phenolic and baked epoxy/phenolic. Another development has resulted from attempts to apply thicker films without multi-coat application. Heavy-bodied vinyl coatings are now available which are said to give 10-20 mils thickness in one application. Hot-spray methods have been used to aid in obtaining films with a small number of coats.

One important application for coatings is that concerned with storage of demineralized water. High pressure boilers require exceptionally pure water, traces of silica being particularly objectionable. Silica, if present in concentrations above a few tenths of a part per million, will deposit

Turn to next page

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When inquiring check 4571 opposite last page

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When inquiring check 4572 opposite last page

Corrosion Trends

Starts on page 38

on tubes and blades and interfere with boiler operation and efficiency. One year immersion tests by a power company indicate that coal-tar enamels can be used for demineralized water storage without contributing dissolved material to water.

Zinc-rich coatings have recently received concentrated interest. Some feel that the inorganic vehicle type offers the most attractive features in this field. Long-term service tests in seawater support claims for good performance of this type of coating.

Continued progress is being made in producing protective mastic coatings from bitumen products containing asbestos fiber. Highly thixotropic properties can be built into water dispersion combinations of this type, permitting spray applications of thick coatings without sag or dripping. Fire-retardant properties can be obtained in new bitumen compositions nearing final development, in which the bitumen is highly chlorinated. This provides a fire-retardant protective coating upon drying.

Quick drying primers for use with pipe-line enamels are just being made available. With conventional primers, which dry slowly under unfavorable weather conditions, coating application frequently has to be interrupted, sometimes for several days, because the primed surface is not dry enough to receive the hot enamel. The new primers will prevent such stoppages.

High surface temperatures of buried steam and hot water lines canot be withstood by conventional coatings. Gilsonite, in granular form, has recently been used for this type of service. Material is poured into ditch around the pipe. Heat from pipe is said to transform the granules into an impervious coating. Special coal-tar enamels have been developed by several manufacturers for hot product lines. These higher melting enamels withstand higher temperatures

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When inquiring check 4574 opposite last page

and are more resistant to soil stresses. Results to date are most satisfactory. Epoxy/coal tar combinations are also being tried in this service.

Structural plastic materials are being used to an increasingly greater extent to control corrosion. Plastic pipe, tanks, and sheet material provide good corrosion protection for certain environments. Polyvinyl chloride is one of the most sucessful plastics for corrosive applications. Saran-lined pipe is also used extensively. Plastic tapes are being offered to compete with established pipe-line coatings. Probably the extent of such applications cannot be foretold, but at least two substantial trial applications of tape have been made.

Glass linings are used in vessels, reactors, and other equipment to control corrosion and prevent product contamination. Considerable savings are expected from the use of glass-lined smokestacks. One outstanding recent development is the successful commercial production of a glass-lined centrifugal pump.

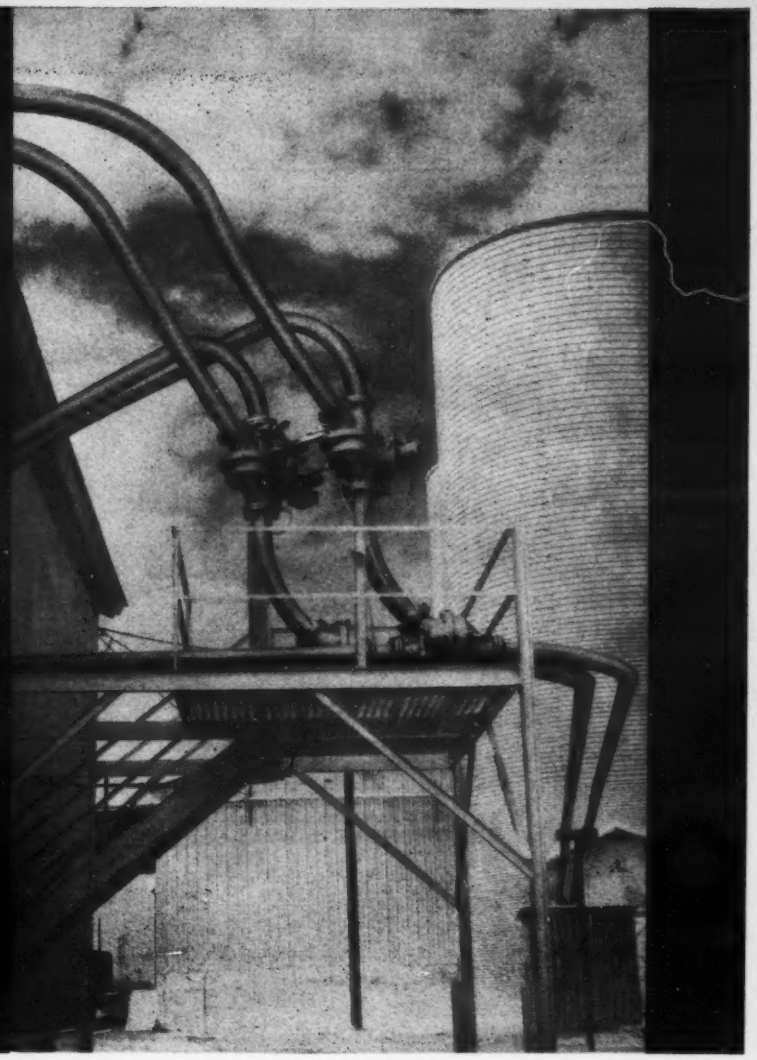
New materials being developed give the corrosion engineer greater latitude in the design of cathodic protection systems. These include high-silicon cast iron anodes, aluminum-zinc alloy galvanic anodes, and silicon rectifiers.

In summary, companies in the corrosion control field will continue to provide established and improved methods, equipment, designs, and materials for combating corrosion — and will keep on furnishing such products and services, together with technical knowledge and consultative advice. It behooves the industry-consumer, plagued with costly corrosion problems, to employ personnel who can successfully exploit these services in reducing corrosion losses.

Education, training, and procurement of corrosion engineers may become a more growing concern of industry. Continued cooperation of management, engineering schools, and technical societies is urged to provide better methods for training specialists in corrosion control. ■

Minerals & Chemicals Corporation of America found...

It pays to specify Alcoa Aluminum Pipe to lick corrosion, prevent product contamination



When resistance to corrosion and freedom from product contamination are important, aluminum pipe is the low cost answer. Here's a case in point:

The McIntyre, Georgia, plant of Minerals & Chemicals Corporation processes Kaolin clays. Pipe originally used in corrosive stages of their process failed in as little as six months. In 1954, they specified ALCOA® Aluminum Pipe to replace it.

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Minerals & Chemicals' engineers sum up their experience this way: "Our original ALCOA Aluminum Pipe proved that it pays to specify aluminum when corrosion is a threat. Now we're using more aluminum pipe as well as aluminum siding and roofing for many of our buildings and conveying systems."

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Other Goodall corrosion control products include P.V.C. Linings, factory-applied in sheet form or by spraying; and "Allgood" Liquid Neoprene Coatings, in cans for brush-on application. **Contact our nearest Branch for details.**

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recent technical papers

Urethane coating may be answer to your corrosion problem

RICHARD C. BURCK
Product Development Supervisor
Mobay Chemical Company
St. Louis, Missouri

Urethane coatings — recently introduced in the United States — have given excellent service in Europe for more than five years in a number of chemical plant installations. The urethane compounds — sometimes referred to as polyurethanes or as isocyanate polymers — provide versatile coatings that can be formulated easily. Coatings have an unusual combination of good solvent resistance, fresh- and salt-water resistance, ability to withstand a wide variety of chemicals, and excellent physical properties.

One application illustrates the value of a urethane coating on a reaction vessel located in one of Farbenfabriken Bayer's plants in Germany. This vessel, which contains a mixture of gasoline and acetic acid, overflows, frequently. Synthetic resin coating used previously had to be replaced almost yearly. Urethane coating, which was applied in November 1955, was still in excellent condition when inspected in January 1957.

Another application is a water-gas generator, located in the same plant, coated with urethane. This coating is subjected to corrosive vapors and temperature variations between freezing and 250°F. Coating was applied in January 1951. Paint films, when inspected during the latter part of 1956, showed some loss of gloss and embrittlement — but no coating failure or corrosion of metal.

A number of other case histories are cited in the technical paper, which suggest the advantages that can be gained through wider use of urethane coatings in this country.

In January of this year, a new product known as Mondur CB was made available to protective coating manufacturers in limited commercial quantities. This isocyanate adduct contains less than 1% free TDI (tolylene diisocyanate) monomer, a chemical which can be irritating if present in larger quantities. The new product is safe to handle without any precautions other than those accepted for safe handling of conventional solvents. Hence, isocyanate coatings are now available which are non-toxic and non-irritating. Coatings are air-curing and are fur-

nished in two parts.

(Condensed from technical paper, "Urethane Coatings," which was presented at the 1957 Annual Meeting of the National Association of Corrosion Engineers in St. Louis.)

(For further information on urethane coatings contact Mobay Chemical Company, Dept. CP, St. Louis 4, Mo. . . . or for more information check 4577 on form which is located opposite last page.)

Rapid measurement of corrosion rates with instrument

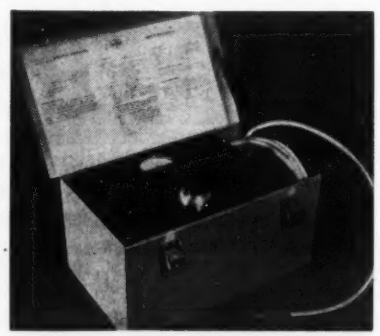
Information on a number of field tests is included

Recent technical paper describes a method for measuring corrosion which involves installation of a special probe in the system under study. Progress of corrosion on the probe is then followed electrically by means of a special meter.

Operation of the corrosometer instrument is based on the fact that the electrical conductivity of most metals is very great, while the conductivity of non-metals is negligible by comparison. As the corrosion process converts metal into non-metal, the electrical resistance of a piece of metal increases. Meter circuit utilizes this change of resistance to indicate the extent of penetration by corrosion on an exposed metal specimen. Circuit is designed so that the readings obtained are essentially independent of the temperature and nature of the corrosive medium.

Technical paper gives detailed information on the principle of operation of the instrument. Details are also included on the development of the probes, of the meters, and the method for temperature compensation. The instrument is currently being used by a number of companies to measure corrosion rates in critical locations. Among case histories discussed in the paper where the corrossion-measuring method is being used successfully is a power oil system, an amine adsorption system, a sugar extraction process, a paper pulp system, and a cathodically protected water tank.

(Technical paper was presented at the Western Regional Division Conference of the National Association of Corrosion Engineers at Long Beach, California, November, 1956. Paper was prepared by Gilson H. Rohrback, Crest Instrument Company, Dept. CP, Santa Fe Springs, Calif. Check 4578 on form opposite last page.)



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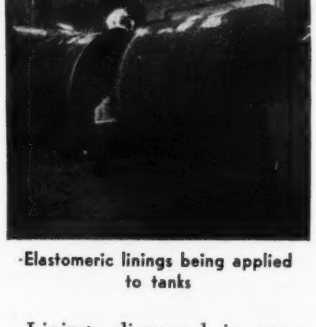
Recent Technical Papers

Starts on page 93

Types of tank linings, how to apply them

Technical paper points out advantages of each material

Recent technical paper discusses the subject of elastomeric lining materials for preventing corrosion of tanks. A number of different types of linings are discussed as well as the methods for applying them. Excellent results can be achieved in preventing corrosion and contamination through the choice of the proper lining and by applying it correctly.



Elastomeric linings being applied to tanks

Linings discussed in paper are defined as being heavy sheets 3/16 to ¼" in thickness, manufactured by plying up thin films to the full thickness of the lining. Such a lining system consists of a priming cement to provide specific adhesion to the structural surface to be lined, a cement cover coat to provide adhesion both to the primer and to the lining, and the lining itself.

Linings available include natural rubber which is available as soft, semi-hard, and hard. Among the synthetic rubber linings are neoprene, nitrile, butyl, Hypalon — and the latest additions, the silicone rubbers and the fluorocarbon rubbers. A third group of lining materials available is the elastomeric plastics including polyvinyl chloride, polyvinylidene, polyethylene, and fluorocarbon plastics.

Temperature characteristics of the lining, chemical resis-

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tivity, and other properties can be varied by changing the composition of the natural rubber when that material is used. Author discusses the specific advantages of neoprene, nitrile, butyl, and other types of linings. Although linings based upon natural rubber presently amount to about 70% of the volume of applied linings, linings based upon butyl rubber have the advantage of being potentially the lowest priced of all the elastomeric lining materials. Hypalon offers extremely high chemical resistivity and at the same time can be applied and cured in much the same manner as the natural rubber compounds.

It is quite important to consider the temperature to which a lining will be submitted when choosing the material to be used. Paper includes some information on patching and field application of linings.

(Condensed from technical paper, "Elastomeric Lining Materials For Corrosion Prevention," which was presented on November 15, 1956 before the North Central Region Conference of the National Association of Corrosion Engineers in Detroit, Michigan. Paper was prepared by Mr. L. A. Woerner, Technical Assistant to the President, Automotive Rubber Company, Inc., Dept. CP, 12550 Beech Rd. at PMRR, Detroit 39, Mich. . . . or for more information about manufacturer's product reader may simply check 4582 on form which is located opposite last page.)

Rigid PVC plastic pipe

Physical properties, features, and flow-rate charts are included in 20-page bulletin on extruded PVC plastic pipe. Hard-covered, loose-leaf-notebook-type bulletin contains corrosion resistance comparison chart covering various types of plastic pipe. "Kraloy Plastic Pipe" — Kraloy Plastic Pipe Co., Inc., Div. of Seamless Rubber Co., a Rexall Drug Co. subsidiary, Dept. CP, 4720 E. Washington Blvd., Los Angeles, Calif. Check 4583.

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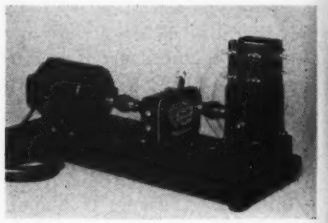
Features: Pumped material does not contact any part of pump mechanism, thus eliminating any possibility of contamination of product or corrosion of pump.

Description: Unit utilizes the principle of moving steel fingers in a wave-like motion over flexible tubing, to pump liquid, gases, or slurries. Capacity range is 0.1 cc per minute to 250 cc per minute. Gum rubber, silicone rubber, surgical gum latex, Neoprene, or polyvinyl tubes can be used. Unit accommodates tubes of ¼, 3/16, ⅛, 1/16″ ID with 1/16″ wall, and 1/32″ ID with 1/32″ wall.



Standard unit includes motor, speed changer, and pump mounted on an aluminum base

Standard setup includes a speed changer, 1/12-hp motor, and pump mounted on an aluminum base.

(Model T-8 Pump is a product of Sigmamotor, Inc., Dept. CP, 18 N. Main St., Middleport, N.Y. Check 4586 opposite last page.)

Corrosion-resistant plastic fittings

Two bulletins of four pages each list advantages, properties, dimensions, weights, and welding techniques for corrosion-resistant thermoplastic pipe and PVC conduit fittings. Cat 380, Supplements 1 and 2 — United States Rubber Co., Dept. CP, Rockefeller Center, New York 20, N.Y. Check 4587.

VOL. V No. 7 JULY 1957

chemical business

Trends in the chemical world . . . what they mean to you as reported by the editors of CHEMICAL PROCESSING

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Hydrocarbon Aerosol Propellants Worry Fluorocarbon Makers 102

Government To Fight Goodrich-Gulf Ameripol Rubber Patents 101

Hornblower & Weeks' Bill White Talks Chemical Stocks 100

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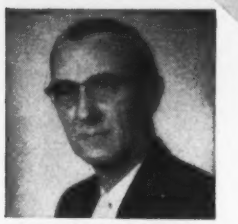

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To accomplish the above, a wide range of experience of Proctor's engineers is applied to your problem, and all items are carefully reviewed and discussed with members of your organization interested in the project so that important points of design are incorporated to attain a successful operating range.

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chemical business

JULY 1957
Vol. V No. 7

Highlights

CCDA views Government's missile program, traces development patterns of chemical super-fuels
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Government claims rights to Goodrich-Gulf Ameripol rubber patents, alleges contract violation
page 101

Aerosol sales soar (320 million cans, 320 million dollars) while propellant makers begin scramble for the market
page 102

Market analyst William R. White of Hornblower and Weeks looks at chemical companies. This month: Olin Mathieson and American Potash
page 106

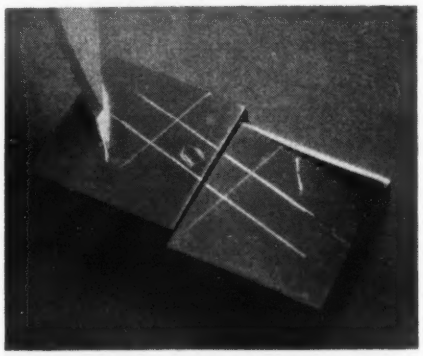
New Material From Corning Lighter Than Aluminum, Harder Than Steel

Terming its discovery "the most important breakthrough ever made in glass research," Corning Glass announced the development of its new Pyroceram, a glass material harder than high carbon steel, lighter than aluminum, and up to nine times stronger than plate glass.

Basically, the material is glass with added nucleating agents. In subsequent heat-treatment, the material becomes crystalline in structure and in effect becomes a ceramic.

First commercial use of the material will probably be noses for missiles, although a number of products are in the development stage. The material can be fabricated like common glass — blown, cast, spun, or molded — and can be made transparent.

Shrinkage (after heat-treating) of the Pyroceram can be predicted to the point where precise dimensions can be held with little or no subsequent machining.



New material will score either steel or brass

Because of its structural strength and chemical resistance, probably the most important use in the chemical field will be in heat exchangers and glass piping systems. The material has three times the heat-transfer coefficient of glass, will stand much greater thermal shock. Pyroceram has greater resistance to erosion and scratching.

Commercial production of the new material is slated to start this month.

Missile Program Offers Research Challenge, $100 to $200 Million Chemical Market

In certain respects, the chemical industry's participation in the Government's missile and jet programs is similar to its participation in the atomic program. Almost all sales and consumption figures are classified; indeed, great secrecy surrounds most of the chemical materials themselves.

Yet, with all this secrecy, certain conclusions can be drawn about the chemical market offered by the Government's search for fuels of greater energy. Some estimates put the chemical industry's share of the 1957 program at between $100 and $200 million . . . even higher in 1958. Those in a position to know will neither confirm nor deny this figure. The upward trend is expected to continue for some time, although, assuming continued peace, it's generally conceded that it will level off sometime in the future.

Pennsalt's **Dr. John F. Gall,** speaking at the recent Commercial Chemical Development Association meeting at French Lick, Ind., likened the demand for a new "exotic" fuel to the trajectory of the missiles themselves.

"The test requirements for a new chemical to be considered for missile use will start at a few pounds for property testing and miscellaneous preliminary phase studies, then move to a few dozen pounds or, if the expense isn't too great in the large laboratory phase, to a few hundred pounds.

"Assuming acceptance thus far, new engines will be designed around the characteristics of the new material and tested out on a scale approximating that of the intended tasks which the new engines are to perform. At this point the demand for fuels can become very large."

In later test stages, a single rocket development program may require a half-dozen test stands in various locations. Each stand is expected to fire about twenty test shots a month, some of them of 100-second duration. And fuel consumption on shots of this length can reach something in the order of 40 tons of chemicals, with an oxidizer/fuel ratio of roughly three to one. Assuming a full firing schedule, a single test program could require a little less than a million pounds of chemical propellant each month. And although most figures are only well founded conjectures, they serve to in-

Turn to next page

"More Definitive Labeling Will Protect Consumer" — Rep. Curtis to CSMA

At their annual midyear meeting in Chicago, more than 800 members of the Chemical Specialties Manufacturers Association heard representative **Thomas B. Curtis** (R-Mo) explain the proposed Federal Hazardous Substances Labeling Act which is now before Congress.

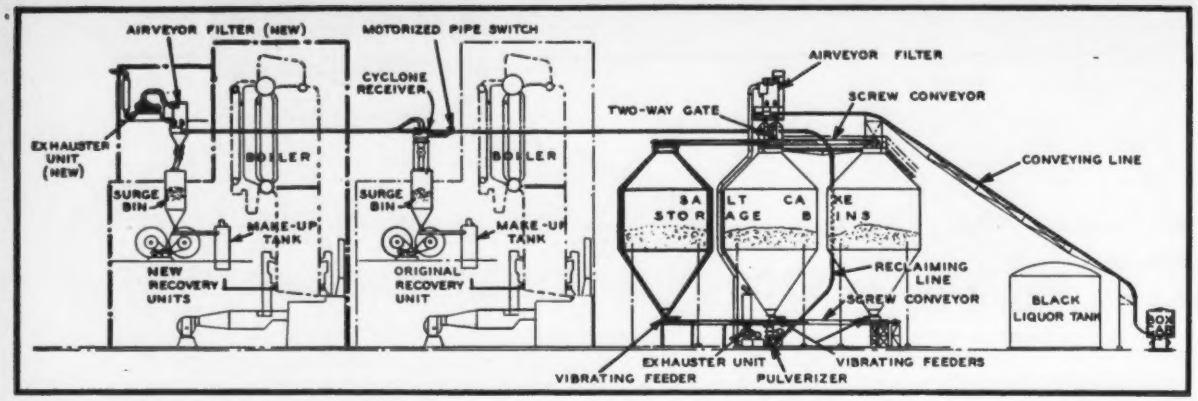
The bill would require makers of potentially dangerous substances for household use to plainly note on the labels any toxic material which might cause troubles to humans if taken internally or placed in contact with their skin.

The bill updates the 1927 Caustic Poison Act which it would supercede.

CSMA members agree that passage of the bill would not require substantial changes in existing labels and would not mean revealing trade secrets.

The chemical industry has long recognized the need to identify hazardous materials and to have a uniform labeling system. In 1944 the Manufacturing Chemists' Association set up a Labels and Precautionary Information Committee. Recommendations have been kept up to date, and now reach deep into the consumer product field.

Curtis asked the advice of manufacturers in framing the bill. Hearings will be held by Representatives **Oren Harris** and **C. A. Wolverton** of the House Committee on Interstate and Foreign Commerce.



Additions: Storage bin, center, shown in heavy line, and screw conveyors to and from bin. Left—recovery units, Airveyor exhauster unit and filter for reclaiming from storage for delivery to recovery units.

For expansion at St. Regis . . . Fuller had the answer

The above drawing illustrates how the St. Regis Paper Company, Jacksonville, Florida, increased its storage and conveying facilities at minimum cost and with little interruption in production.

Original Airveyor conveying system for both unloading salt cake from cars to storage and reclaiming from storage for delivery to recovery unit.

PROBLEM No. 1:
Original installation
Year 1952

Unload salt cake from box cars, convey to storage, reclaim from storage and deliver to recovery unit. Mill capacity, 300 tons of pulp a day.

SOLUTION:

The Airveyor conveying system was selected and installed to perform all of the above functions . . . a dual system using a single exhauster unit and filter for both unloading and reclaiming . . . only one of these operations to be performed at any one time. This method of operation was sufficient for all plant requirements at capacity then required.

PROBLEM No. 2:
Expansion
Year 1955

Increase of mill capacity from 300 tons to 1300 tons of pulp a day. This increase demanded additional recovery units, storage, and conveying alterations.

SOLUTION:

To continue using the original Airveyor system meant taxing the unit to its ultimate capacity, as well as congestion in the operation of the recovery unit, with little or no factor of safety. In order to provide satisfactory overall operation at all times, it was decided to divorce the reclaiming system and provide separate units, one for unloading and the other for reclaiming. This allows the operator of the recovery unit freedom of operation without interfering with the unloading operation. This change was accomplished by retaining the original exhauster and filter for unloading, extending the screw conveyors to serve the additional storage. An additional filter, exhauster, and conveying line transformed the reclaiming system to a separate and distinct unit. These changes to the Airveyor were accomplished at minimum expense, with very little interruption in production during alterations.

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Rockets

Starts on preceding page

dicate the market extent.

"Within a small number of years," Gall continues, "the testing program is completed and the chemical propellant becomes operational. At this time, during peaceful conditions, **and prior to frequent space travel schedules,** the demand for the propellant will sag substantially."

This, from the chemical maker's point of view, isn't the most ideal of market situations. The first requirement in most marketing programs is to assure at least a stable, if not growing, market. However, chemical sellers are even now looking to civilian markets for the high-energy fuels . . . principally in jet airliners.

Most activity has been in the field of oxidizers, and probably the biggest current market offered by the program for a single chemical product is for liquid oxygen, still the most widely used oxidizer. No one can say how much of the current liquid oxygen output is going into missiles but recent expansion figures for the material are significant: By the end of 1957, US capacity for liquid oxygen will be an annual 40 billion cu ft, a 60 percent increase over last year's production. And some oxygen suppliers are saying privately that the Government's insatiable requirements for the material are keeping their operations in an uproar.

Other oxidizers are being touted by chemical makers. Fluorine compounds are getting close attention from missile people as is pure liquid fluorine. Pennsalt is showing considerable interest in liquid fluorine, and General Chemical recently began shipping tonnage quantities of the material (see CHEMICAL PROCESSING, Dec. 1956, page 120).

Another good bet is 100 percent liquid ozone. While not produced commercially now, tests have been encouraging and the problems involved with its use aren't insurmountable.

Goodrich-Gulf Ameripol Rubber In For A Two-Way Stretch

In a reportedly unprecedented move, the Department of Justice has charged that Goodrich-Gulf Chemicals is in violation of its research contract in refusing to turn over to the Government rights to its newly developed Ameripol SN synthetic rubber process. The rubber company's position is that the contract, while indeed binding on all developments made under Federal grants by the B. F. Goodrich company, doesn't apply to research carried on by Goodrich-Gulf, developer of the synthetic.

Goodrich-Gulf is under the 50-50 ownership of B. F. Goodrich and Gulf Oil.

The main point of contention, apparently, is one of definition: Does Goodrich-Gulf, under the terms of the contract, fall into the category of a B. F. Goodrich subsidiary?

Goodrich says no. The Justice Department maintains that it does.

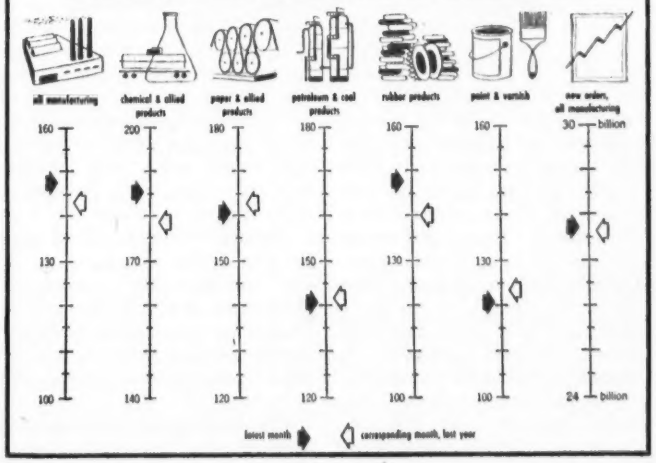
Contract in question, the complaint alleges, ran from 1949 until 1955. It granted (B. F.) Goodrich funds considerably in excess of $1 million to carry out research on rubber-like polymers of butadiene. Under its terms, the charge continues, any information within the scope of the contract, acquired by either Goodrich or its subsidiaries, would be turned over to the Government. The contract also granted the Government royalty-free license to use this information and presumably to turn it over to other companies.

Goodrich-Gulf, however, in explaining that the Ameripol process in no way relates to the contract in question, points out that the original process information was purchased with private funds in Germany in 1954.

Probably the first reaction of other chemical companies working under similar government contracts will be a reappraisal of the language of these contracts. While the contracts between the Government and companies working on the wartime (and post-war) synthetic rubber projects were considerably more sweeping than most current research agreements, parallel situations could develop.

chemical business INDEX

Production indices, from latest available Federal Reserve Board figures, based on 1947-49=100. New Orders, All Manufacturing, (last column) from latest available Department of Commerce data.



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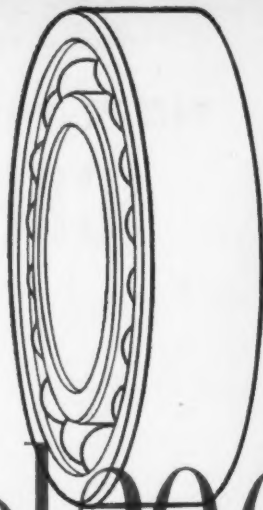

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Titer °C	70-74	70-74
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Iodine Value	4 Maximum	3 Maximum
Saponification Value	182-187	177-181
Acetyl Value	133 Minimum	138 Minimum
Hydroxyl Value	147 Minimum	155 Minimum

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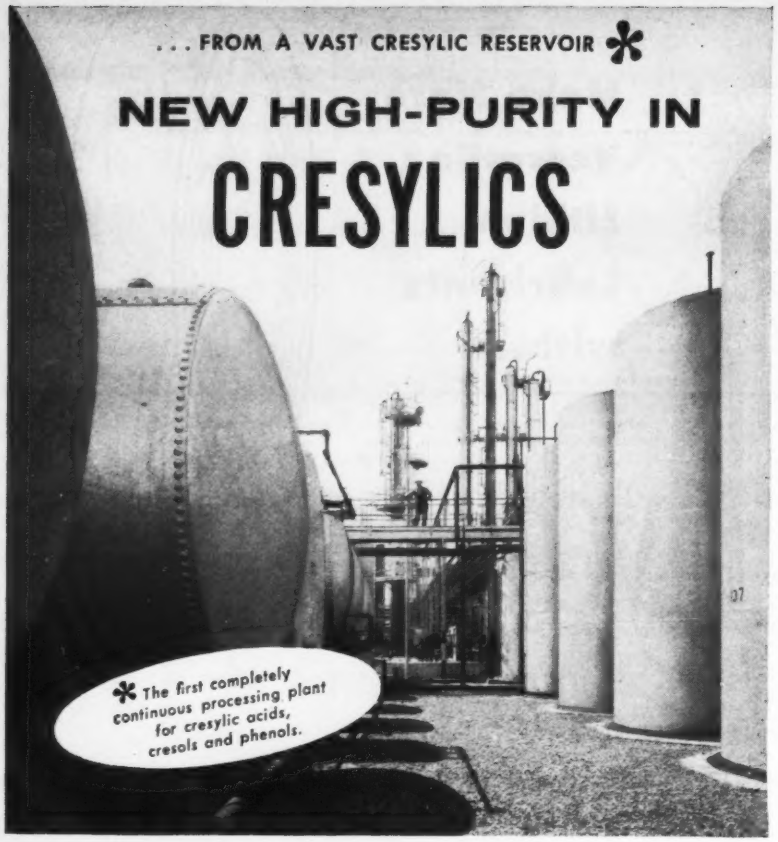

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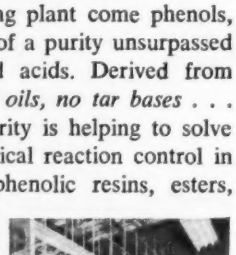

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chemical business — **Marketing Trends**

Aerosol Sales Hit Record $320 Million Last Year; Competition Grows Among Propellant Makers

Despite room for niggling doubts in some quarters of the industry, aerosol makers revelled in enthusiasm at the recent Chemical Specialties Manufacturers Association meeting in Chicago. The billionth pressurized container has recently crossed the counter (one can maker is planning to produce its own billionth aerosol can sometime this fall), sales in 1956 reached a record $320 million, the first really new ideas in quite a while — recent research has pretty much been limited to new products instead of new concepts — have passed the lab stage and are now on the market.

And although showing equal enthusiasm, fluorocarbon makers, long having an easy time of it in the aerosol business, can look forward now to increasing competition not only among themselves but from other propellant materials.

Sales of fluorocarbons amounted to something in the neighborhood of 140 million pounds in 1956 (about 45 percent of it went into aerosols). The bulk of this was produced by DuPont and Allied's General Chemical, although Pennsalt began making deliveries late in the year. Now with Union Carbide entering the picture and Pennsalt building a second plant (Pennsalt's second unit and the new UCC unit will make a total of ten plants making the materials) the honeymoon seems about to be over.

When all of the new units are operating, total US capacity for propellants will be well in excess of 300 million pounds annually. Good guessers are placing the 1957 aerosol market at close to 400 million units. If this turns out to be accurate, it will absorb 15 million more pounds of propellants than the 1956 requirements. This figure, though, is to be tempered by the fact that the fastest recent growth in aerosol sales is in the smaller units, six ounces and under. And, at best, this still leaves a lot of Freons, Genetrons, and Isotrons to be sold before production capacity is reached.

Here's the breakdown on the 320 million units sold in 1956: The most noteworthy change was the rapid growth in personal product sales — hair sprays, shaving creams and such. The annual CSMA survey of aerosol sales indicated that this personal category accounted for about half of the total aerosol sales. Hair sprays, with a spectacular 50 percent sales increase over last year, sold almost 80 million units, usurping the number one spot from its traditional occupant, insecticides. The insecticides, second in the standings, sold a little over 52 million, approximately last year's level.

Third place seller was shaving lather with 42 million units sold, also showing no significant increase over last year.

Another 45 percent of the fluorocarbon market is in the refrigeration industry. However, the appliance business has always been problematical, and this year will certainly be no exception.

But increased competition among the suppliers isn't

the only area to watch. Recent developments in propellant systems research are pointing to increased use of other propellant materials, notably the light hydrocarbons.

Butane, isobutane and propane are in the picture now with butane far in the lead. The chief advantage of the hydrocarbons, of course, is cost — a fluorocarbon charge in a typical aerosol costs around 1.5 cents, a butane charge costs less than a half cent.

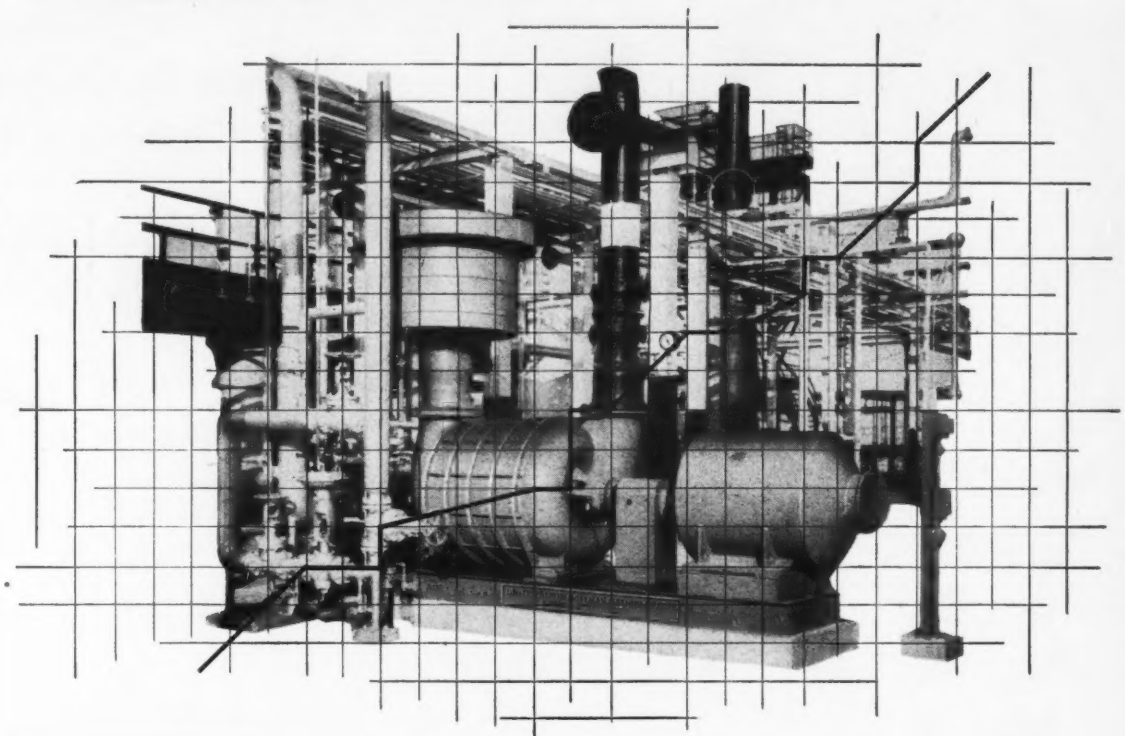
Another major impetus to research in hydrocarbon systems was the fact that Carter Products Inc. holds most of the basic patents on foaming product dispensers. While some makers go along with the licensing fees, others, notably Colgate-Palmolive, have been busy developing their own systems.

The chief disadvantage is flammability, not so much at the point of use but in the filling operation. Hydrocarbon enthusiasts point to the fact that no accidents have been reported in the months that the butane systems have been on the market. Also, **the ICC has raised no protests** against shipping the units. But the loading operation is another story. Safe butane storage facilities are expensive, at least relative to fluorocarbon storage costs. And filling lines must be completely explosion proof — a considerable expense, particularly for loaders who would have to rebuild or replace existing equipment.

Some loaders are equipped to handle butane now, and more installations are in the talking stage. And 1957 sales of hydrocarbon propelled aerosols are expected to reach 50 million units.

And, intermural hassles notwithstanding, the aerosol industry as a whole has well founded reason for optimism. With sales of pressurized packages tied to the public's taste for luxury goods, aerosols have little to fear these days.

Hoffman engineered systems get **results:**



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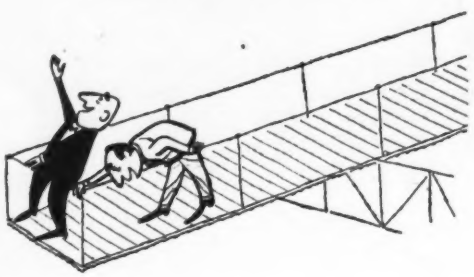

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chemical business — Our Growing Industry

Spencer To Double High-Pressure Poly Capacity at Texas Plant

Spencer Chemical has announced expansion of its Orange, Texas, polyethylene operation which will boost low and medium density resins capacity from an annual 45 million pounds to 90 million pounds. The new operation will use the conventional high pressure process.

The expansion is expected to be completed within one year.

Spencer forecasts that the market for conventional polyethylene will increase by some 250 million pounds annually in the next four years, nonwithstanding the development and production of other polyethylene types.

The company also has pilot plant facilities in operation at Pittsburg, Kan., producing catalytic polyethylene under a license from Standard Oil.

The operation will produce an annual 24 million pounds of PE and 100 million pounds of formaldehyde, basic raw material for PE.

The operation, to be completed and running to full capacity by September, uses the Swiss Inventa process for the first time in the US.

Airco Opens Liquid Oxygen, Nitrogen Plant

Air Reduction has opened its third large air separation plant, this one at Chicago. Built at a cost of over $7.5 million, the operation has a capacity of 55 tons of liquid oxygen, 15 tons of liquid nitrogen, and 3.5 tons of liquid argon daily.

Other Airco liquid oxygen, nitrogen, and argon plants are at Butler, Pa., and Riverton, N. J. Similar units are under construction by the company at Los Angeles, and Acton, Mass.

First Pentaerythritol Unit For Midwest

Startup of its new pentaerythritol operation at Louisiana, Mo., has been announced by Hercules. The plant, the first integrated PE plant in the US, increases the company's capacity for the material to something like 50 million pounds annually. The oper-

Monsanto Doubles Production Of Bisphenol A

Monsanto's output of bisphenol A, a resin intermediate for the manufacture of epoxy and oil-soluble phenolic resins, has doubled since the recent expansion of the company's St. Louis facilities.

Most of the boosted output is attributed to increased use of epoxies. Domestic production of these resins in 1956 totaled 30 million pounds, a 50 percent increase over the 1955 US output. About 70 percent of the resin production goes into surface coatings, but their use in metal forming equipment is growing rapidly, says Monsanto's Organic Division resin materials sales manager, **H. J. Lawler.** He estimated that seven million pounds of epoxy resins went into tool making in 1956.

Food Machinery's Ernest Hart New MCA Chairman

Food Machinery and Chemical's President Ernest Hart has been elected chairman of the board of the Manufacturing Chemists' Association at the organization's 85th annual meeting at White Sulphur Springs, W. Va.

Harry B. McClure, Union Carbide v-p, was elected chairman of the executive committee and General J. E. Hull, USA (Ret.), was reelected full-time president and director of the group.

Hooker's board chairman, R. L. Murray, and Rohm & Haas v-p, D. S. Frederick, are new vice presidents.

Boosts Phthalic Anhydride Output

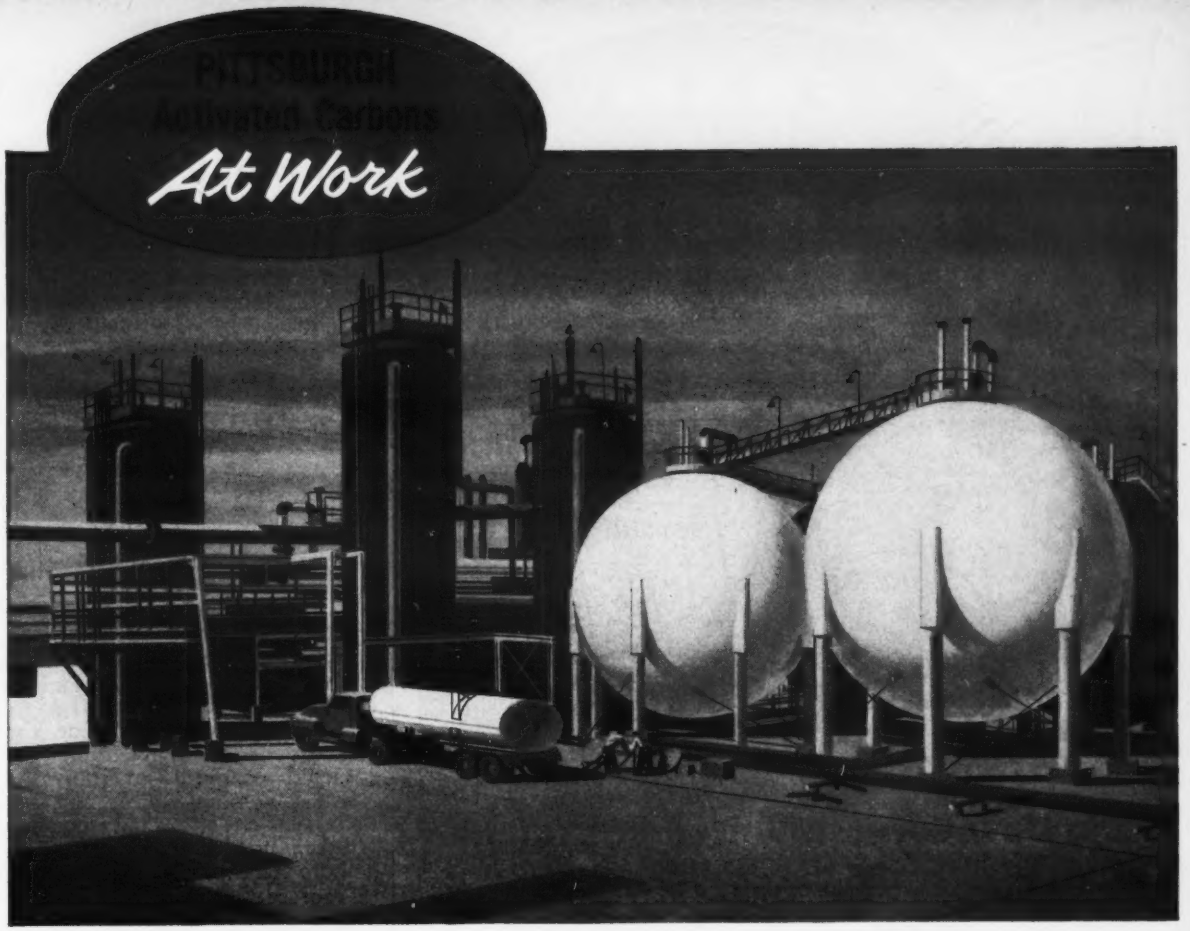
Startup of Pittsburgh Coke & Chemical's new $3 million phthalic anhydride facilities will double the company's production of the material.

Built on Neville Island in the Ohio River below Pittsburgh, the plant is an expansion of existing facilities, will not seriously interrupt existing production when it goes on stream.

Cyanamid Breaks Ground For Fiber Operation

Cyanamid has started construction outside Pensacola, Fla., on new facilities for production of its acrylic fiber, Creslan. Planned for an initial annual capacity of 27 million pounds of Creslan staple and tow — with an expansion potential of double that — the operation is expected to be completed late next year.

According to Cyanamid president **Kenneth C. Towe,** demand for fibers is increasing on the average of between 80 and 90 million pounds annually.



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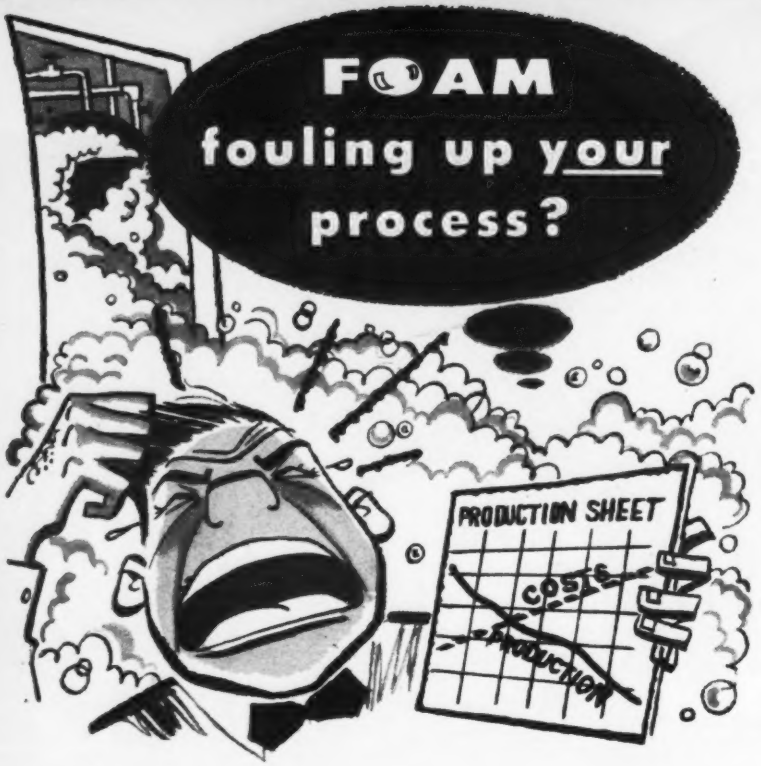

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When inquiring check 4595 opposite last page

chemical business

Growth Potential In High-Energy Fuel Makers Interests Investors

William R. White
Market Analyst, Hornblower & Weeks

Mounting enthusiasm over growth potentials in new jet fuels has awakened investment interest in chemical stocks. Lifting of some security regulations has touched off public buying in shares of leading chemical producers.

This development, along with increasing emphasis by the Defense Department on nuclear weapons, directs attention to Olin Mathieson, which has an important stake in the missile program; and to American Potash & Chemical.

Sales of American Potash have tripled in the last decade and are being projected at a new peak for 1957 well above the $41.8 million achieved last year. It is expected that margins should compare favorably with last year's figures, and the 1957 net profit may approximate last year's per share showing of $2.44. Progress was accelerated last year by including, for the first time on a consolidated basis, sales and earnings of the 50.1 percent owned American Lithium Chemicals, Inc. The minority interest in the latter is owned by Bikita Minerals, in which American Potash, in turn, has a 21.25 percent interest. Bikita holds high grade lithium-beryllium deposits in Southern Rhodesia.

Olin Mathieson's rapid expansion has taken the firm into a wide variety of chemicals. In the enlargement of interests, the company has attained a strong position in nuclear weapons through a half interest in Reaction Motors, Inc., and a quarter interest in Marquardt Aircraft Company, manufacturers of engines for missiles and rockets. The company has been engaged for years in developing modern fuels and currently is constructing a $36 million plant for the Air Force in Model City, N. Y., where new high-energy fuels are to be produced. Boron, lithium, and fluorine are believed to be integral materials.

Endeavoring to capitalize on glamorous research projects such as modern jet fuels, investors tend to place relatively high appraisals on current earning power of representative chemical companies. In the case of Olin Mathieson, for example, earnings this year may not greatly surpass the 1956 showing of $3.38 a share. Results in the first three months of this year, as a matter of fact, were almost exactly the same as in the corresponding period of 1956 — 75 cents a share, against 76 cents a year ago. The stock thus has been selling recently at 14 to 15 times possible 1957 earnings. It is generally assumed that the $2 annual dividend rate in force for the last three years is unlikely to be altered in the near future.

For further investment information on Olin Mathieson or American Potash, write Hornblower & Weeks, Dept. CB, 40 Wall Street, New York 5, N. Y., or check 4596 on form opposite last page.

William R. White has been a market analyst with Hornblower & Weeks for the past 18 years. Previously he was financial editor for the New York Evening Post.

White was president of the New York Society of Security Analysts, 1954-55, and vice president of the National Federation of Financial Analysts Societies, 1955-56.

chemical business

Spotlight on people

Dr. Albert Muller, former director of metallurgical research for Air Reduction central research labs., is appointed assistant to the president for Air Reduction Sales Company, division of Air Reduction Co., Inc. Dr. Muller's new duties will be to assist the president of the division with respect to acquisition and development of new products and processes.

International Mineral and Chemical Corporation makes **Thomas E. Allen** market development manager.

H. W. DuVal is promoted to post of sales manager for chemical division at Reichhold Chemicals, Inc.

DuVal

News at Crown Zellerbach . . . **Leonard F. Beckers** is elected controller. At the same time, **William L. Meyer** and **Fred H. Land** are made assistant controllers.

Donald G. Brower, who had been acting manager of research division of Victor Chemical, is named manager of research.

3M elects **Joseph C. Duke** and **Bert S. Cross,** both vice presidents, to board of directors. Re-elected members of board are **William L. McKnight,** chairman; **Herbert P. Buetow,** president; **Archibald G. Bush, John L. Connolly, John C. Dwan, George H. Halpin, John G. Ordway, Clarence B. Sampair** and **Louis F. Weyand.**

New v-p in charge of sales and market development for Michigan Chemical Corporation is **H. Stanley Lawton.**

Changes in management at Olin Mathieson . . . **John M. Olin** becomes chairman of financial and operating policy committee and will also continue to serve as chairman of executive committee; while **Thomas S. Nichols** is named chairman of board of directors. **R. Carter Dye** is promoted to general sales manager for Olin Aluminum. And in the Industrial Chemicals Div., **W. Adrian King** is new general sales manager.

Nichols

Dr. E. M. Kipp joins Foote Mineral as director of research.

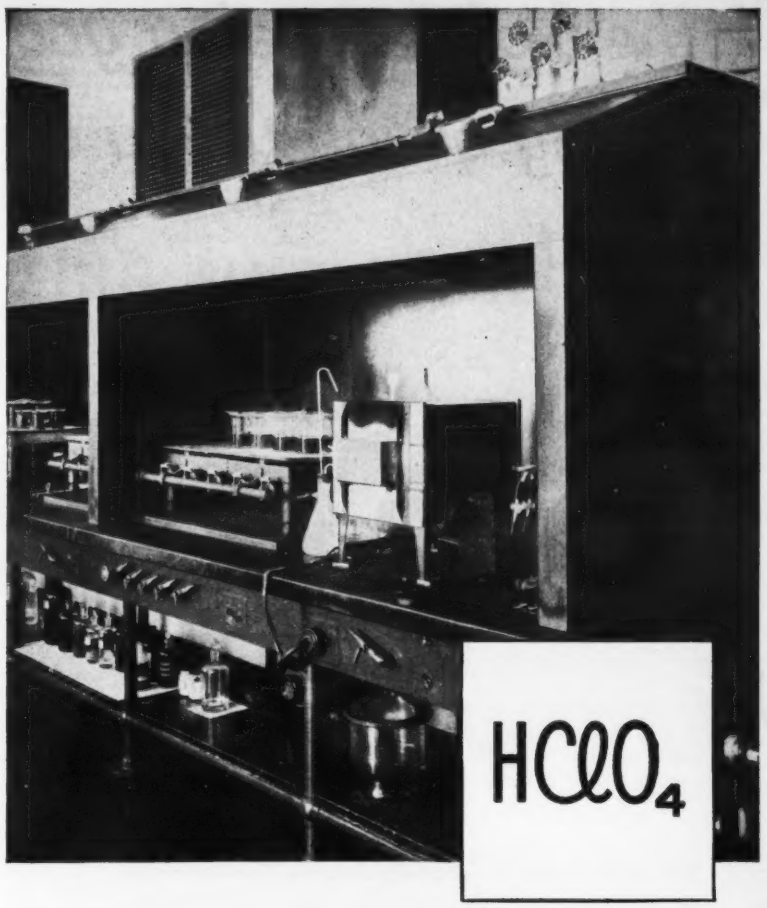
Two new members of American Cyanamid's executive committee are **Dr. W. G. Malcolm,** vice president of company; and **Alex H. Sands Jr.,** v-p of Duke Power Company, who is also made an honorary director of the board. Sands is also appointed to the incentive compensation committee.

Krinsly

Stuart Z. Krinsly is elected to the board at Sun Chemical. Krinsly will retain his duties as secretary of corporation.

Velsicol Chemical Corporation announces promotion of **Elwood W. Phares** to position of manager, marketing and commercial development.

Henry W. DeVore is promoted to director of Barrett's plastics and resins sales, for Allied Chemical & Dye. Succeeding DeVore as manager of Plaskon molding compound sales for division is **Whiting N. Shepard.**



Let's talk "LOW ABSORBENCY"

For perchloric acid fume hoods.

Alberene Stone has a low absorbency factor of 0.15%. It's essentially nonstaining. Easily cleaned. And readily machined for tongue and groove, watertight construction.

Both of these features are absolutely essential for perchloric hoods — where thorough water flushing and removal is necessary to keep them deposit-free.

Further, with Alberene Stone — *the natural silicate stone whose surface goes all the way thru* — the all-silicate mineral components resist chemical attack.

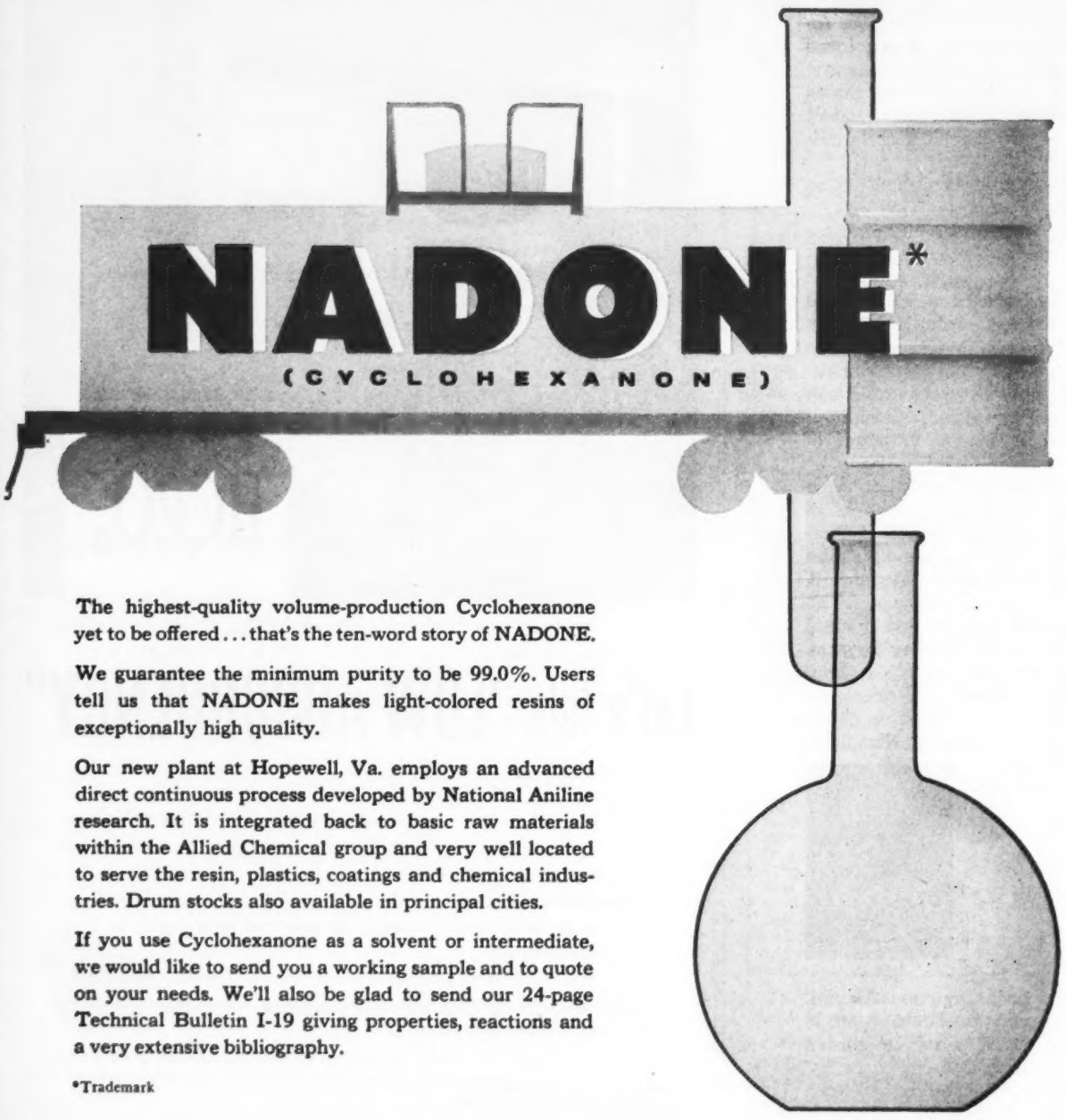
Our engineers are ready to help you select or design perchloric hoods or other special-purpose hoods. Alberene Stone Corporation, 419 Fourth Avenue, New York 16, N. Y.

ALBERENE STONE

provides LOW ABSORBENCY protection

When inquiring check 4597 opposite last page

the highest quality you can get in any quantity you can use!



The highest-quality volume-production Cyclohexanone yet to be offered... that's the ten-word story of NADONE.

We guarantee the minimum purity to be 99.0%. Users tell us that NADONE makes light-colored resins of exceptionally high quality.

Our new plant at Hopewell, Va. employs an advanced direct continuous process developed by National Aniline research. It is integrated back to basic raw materials within the Allied Chemical group and very well located to serve the resin, plastics, coatings and chemical industries. Drum stocks also available in principal cities.

If you use Cyclohexanone as a solvent or intermediate, we would like to send you a working sample and to quote on your needs. We'll also be glad to send our 24-page Technical Bulletin I-19 giving properties, reactions and a very extensive bibliography.

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NATIONAL ANILINE DIVISION

ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.

Akron Atlanta Boston Charlotte Chattanooga Chicago Columbus, Ga. Greensboro Los Angeles
New Orleans Philadelphia Portland, Ore. Providence Richmond San Francisco Toronto

When inquiring check 4598 opposite last page

Chemical Markets

Starts on page 30

Laboratories, and so on, started here and found this to be a good area for manufacturing; they found they could get good chemical engineers and other personnel at low prices, and so they decided to stay.

I mentioned Toni and Raymond. There are, of course, many other compaines such as L & K Laboratories, LaMaur, and others; it is a highly competitive industry. It is a reasonably high profit industry, which explains why they can make the products here and ship them somewhere else. They use detergents and alcohols, soaps and glycerin, thickeners and lanolin, perfumes and perfume ingredients, essential oils and colors, and opacifiers. They also make a lot of chemical raw materials, especially Raymond Laboratories.

To go quickly beyond this we have the vegetable oil production field — Cargill, A-D-M, and so on — and the resin manufacturers. They use things like glycerin, penteratol, malaic anhydride, pthalic anhydride, and many, many other things.

The general chemical manufacturing industry, while small here, is an annual consumer of $7 to $10,000,000 worth of inorganic and organic chemicals normally put into the market data as NEC (not elsewhere classified). As a distributing area the Twin Cities are ninth in the US., in things like paints, greases, and so on, they are third. Kansas City, by the way, is eleventh, and if you average the distribution patterns of the Twin Cities and Kansas City you get a pattern of third in the US.

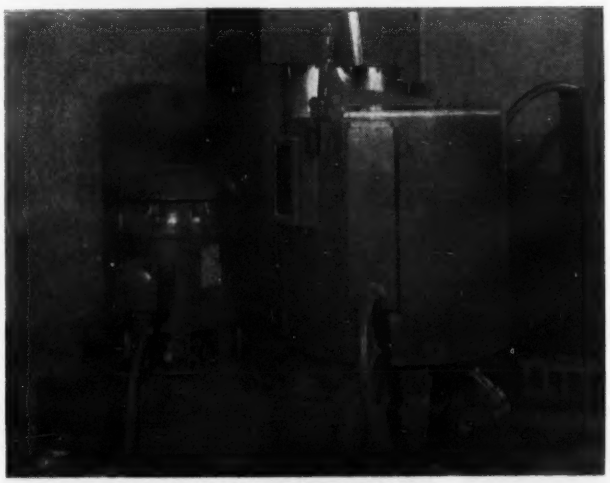
The market, growing slowly but surely, seems to be pretty well covered by the manufacturers' reps and the distributors. One of the most active is the m. h. Baker Company; Thompson-Hayward does an excellent job of working warehouse stocks, and firms like Horton-Earl do a good two-pronged job of hitting the paint and the agricultural chemical field. ■

Polymel Paint Company boasts better quality product at lower cost with efficient dispersion mill that . . .

CUTS PAINT MIXING TIME 98%

TED F. MEINHOLD, Associate Editor
With **C. G. LACROSSE, JR.,**
Production Manager
The Polymel Paint Company, Baltimore, Maryland

Mill can be cleaned in matter of minutes. Tank's interior is smooth, making it possible to switch to a different color batch after quick rinse with a solvent



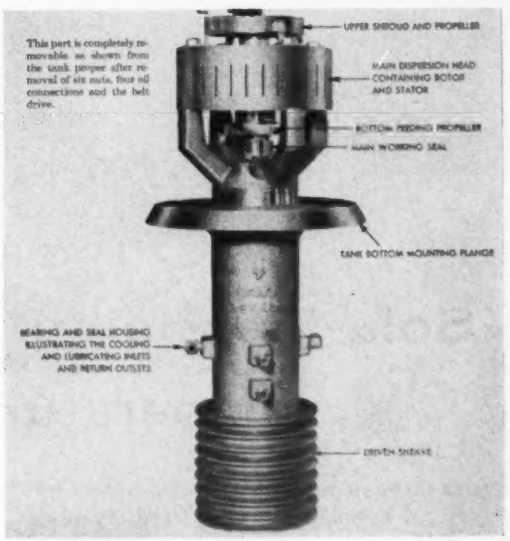
Dispersion mill is bottom-driven through V-belt drive by 40-hp motor

Paint mixing operations that used to take as long as two days are now being completed in less than one hour at The Polymel Paint Company, Baltimore, Maryland. Using a dispersion device known as the Kady Mill (see Chemical Processing, Sept. 1955, pages 148-149), uniform 75-gallon batches of butadiene-styrene, vinyl, and acrylic latex paints are being turned out quickly and efficiently with minimum labor, operating, and maintenance costs.

Originally installed in October, 1955, the mill has increased production, improved quality, and decreased inventory. Company has had no difficulty in blending the latex ingredient with all pigmentation in a single operation. Many batches are completed within a half hour after loading. Product can be discharged directly into labelled cans, or if desired, sent to holding tanks for future fillings.

The "business end" of the mill consists of a heavy spindle housing supporting a heavy-duty nickel-steel dispersion head (see drawing). In operation, the solid agglomerate in the liquid is accelerated very rapidly by the rotor within the slotted cylindrical stator. The solids impinge against the slots and are reduced to colloidal size. There is no reliance on close

Turn to next page


This part is completely removable as shown from the tank proper after removal of six nuts, four oil connections and the belt drive.
UPPER SHROUD AND PROPELLER
MAIN DISPERSION HEAD CONTAINING ROTOR AND STATOR
BOTTOM FEEDING PROPELLER
MAIN WORKING SEAL
TANK BOTTOM MOUNTING FLANGE
BEARING AND SEAL HOUSING ILLUSTRATING THE COOLING AND LUBRICATING INLETS AND RETURN OUTLETS
DRIVEN SHEAVE

View of assembled mixing mechanism shows location of primary impellers and main dispersion head

Paint Mixing

Starts on preceding page

tolerance or shear to achieve dispersion.

Mill's tank is of special spun construction polished to a sanitary finish. It is water-jacketed throughout. Main motor and mill base is constructed of welded and bolted channel sections, and includes 40-hp motor, motor base, and belt take-up and drive housing. All principal working parts of mill are readily accessible for maintenance without need for special tools or skilled mechanics.

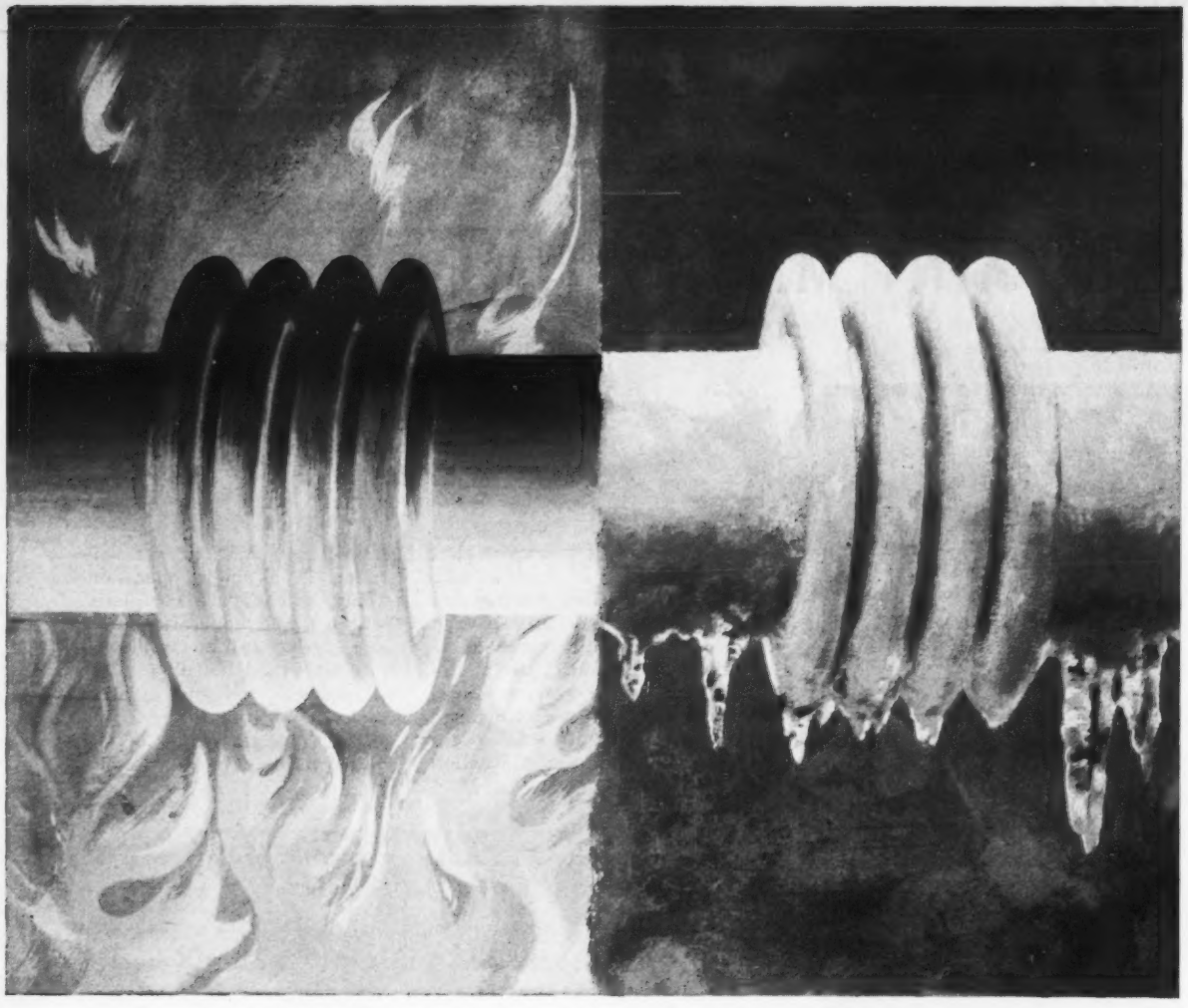
Batches are charged directly to mill—eliminating need for paste mixers. Mill is easily cleaned and it is not necessary to have individual units for separate colors. Cleaning is done by flushing with a solvent and wiping down the interior. Most difficult cleaning job takes only matter of minutes.

One of the outstanding features of the mill, according to Polymel, is its ability to operate at 400-450°F when the water is turned off from the jacket. Company finds this especially useful when making low-melting paint resin and liquid hot melts.

(Kady Mill is product of Kinetic Dispersion Corporation, Dept. CP, 95 Botsford Place, Buffalo 16, New York . . . or for more information check 4600 on form opposite last page.)

JULY . . . AUGUST . . . SEPTEMBER

And September is the month for the Instrumentation feature. Part of it will be an up-to-date look at the automated plant . . . a report of a spontaneous panel discussion by more than twenty of the top men in the instrumentation field. Read this highlight of September's Instrumentation feature.



HOT OR COLD

Sola-Flex® joints are designed for temperature extremes

FROM LIQUID OXYGEN at –300 F, to extremely hot materials at 2000 F, Sola-Flex bellows and expansion joints are engineered for long periods of rugged service under severe temperature extremes.

In cold oxygen lines, Sola-Flex joints reliably handle high pressures in extended positions and the U-span design offers no internal pockets to conceal dangerous contaminants. In high temperature applications, Sola-Flex joints require no external reinforcement rings, provide an economical solution to expansion problems.

Hot or cold, large or small, high pressure or low—no matter what your particular piping need, experienced Solar engineers can recommend exactly the right expansion joint for you. Write today for the latest Sola-Flex catalog. Department D-43, Solar Aircraft Company, San Diego 12, California.

Sola-Flex Bellows and Expansion Joints for industry are designed and manufactured by Solar Aircraft Company

SOLA FLEX

When inquiring check 4599 opposite last page

Over 98% dust removed by cyclonic scrubbers on lime kilns

Installation completes plant's air pollution control program

Major air pollution abatement program has been completed at the Niagara Falls plant of Electro Metallurgical Company, a Division of Union Carbide and Carbon Corporation, with the installation of scrubbers on three rotary lime kilns. This puts the finishing touches to the program, which was started several years ago, and involved various sections of the plant. Cost of the overall project amounted to several million dollars.

Work on the final phase of the project — installation of scrubbers — started two years ago when an experimental unit was installed. Costing more than $100,000, the installation proved satisfactory with efficiencies greater than 98% and as high as 99.38%. As a result, the two other units were ordered, too.

The scrubbers, 12′ diam and 33′ high, have 22 sets of water spray nozzles. Dust laden gases from the kilns are passed up through the sprays of water in a rotary motion. Dust collects in form of sludge and is transferred to large pumps and out to a settling basin.

Each scrubber can handle 29,000 cu ft gas per minute. Units are tied into each other so as to permit shutdown of any one for maintenance and still operate at top efficiency with the other two. Some 1150 gpm water is used. Motors for pumps, fans, and auxiliary equipment are rated at 550 hp.

Temperature of inlet gases is 1350°F. Clean gas is discharged at 180°F. Inlet flues are lined with firebrick to withstand these temperatures. Scrubbers are gunited to protect against corrosion. Another special feature is 10″ rubber hose at discharge of sludge pumps.

(Cyclonic scrubbers are manufactured under Pease-Anthony patents by Chemical Construction Corp., Dept. CP, 525 W. 43rd St., New York, N.Y. . . . or for more information check 4601 opp. last page.)

from a kernel of corn

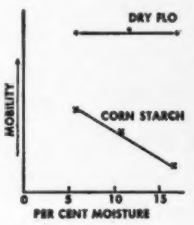
through chemistry . . .

STARCH

that flows like water

It's National's free-flowing, modified starch—DRY FLO. Essentially an organic powder, you can pump it! Spray it! Just like a liquid.

Further, DRY FLO is water repellent. Actually floats on water. Yet it can absorb moisture with hardly any loss of either water repellency or mobility, as illustrated on the chart.



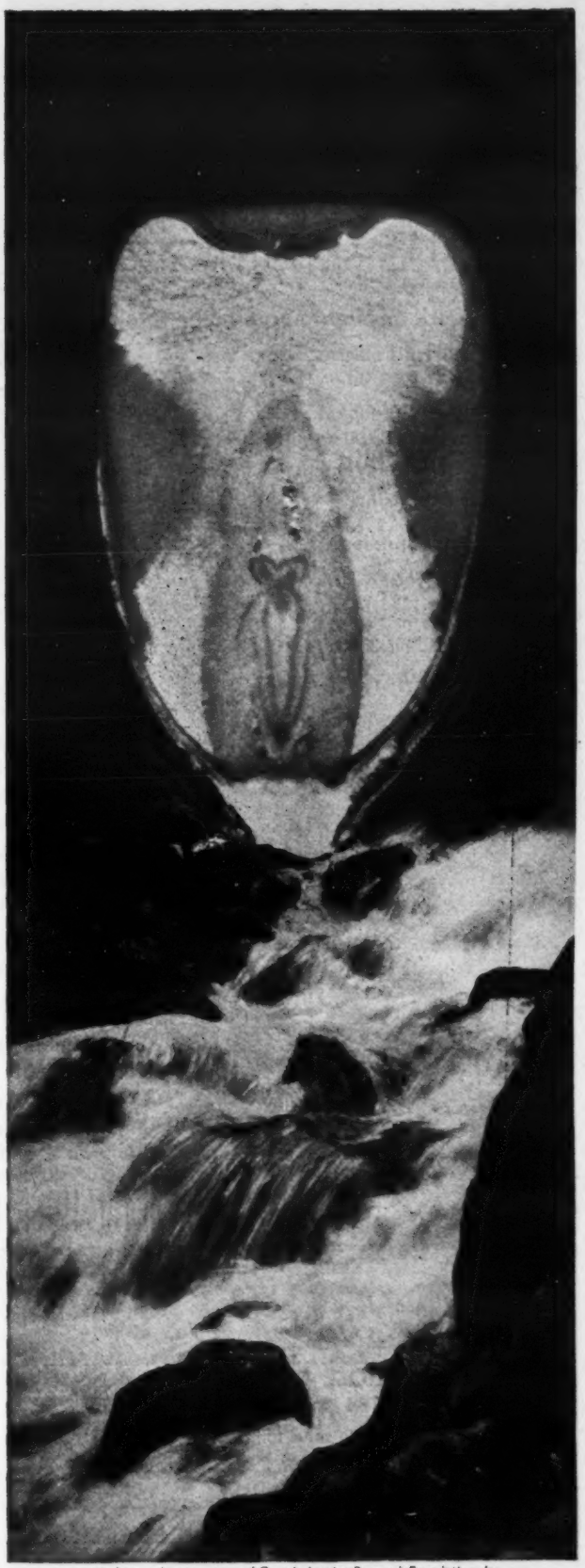
DRY FLO's properties are unmatched by any known powder. They suggest these uses:

- Dusting agent. For plastic films, rubber, etc.
- Spray to prevent offset in printing.
- Moisture absorbent. As a processing aid.
- Anticaking or free-flowing agent.
- In pharmaceutical products.
- In cosmetics.

Where can you use DRY FLO?

National STARCH PRODUCTS INC.

National Starch Products Inc.
270 Madison Ave., New York 16, N. Y.



Kernel of corn photo courtesy of Corn Industries Research Foundation, Inc.

When inquiring check 4602 opposite last page

ALLFLEX

stainless steel *FLEXIBLE* connectors

A NEW stock answer to pipeline problems caused by rigid connections.

- Dampens Vibration
- Compensates for Misalignment
- Permits Offset Movement
- Absorbs Expansion

With *ALLFLEX* Stainless Steel Connectors you get:

- CORROSION RESISTANCE... *Plus*
- PRESSURE RESISTANCE... *Plus*
- HEAT RESISTANCE... *Plus*
- FLEXIBILITY

Stock Sizes	Stock Lengths
¼"	12"
⅜"	18"
½"	24"
¾"	30"
1"	36"
1¼"	48"
1½"	
2"	

. . . also available in all standard sizes, in any required length, with any standard or special fitting or flange.

Full engineering information on *ALLFLEX* Stainless Steel Hose can be found in: Chemical Engineering Catalog, pages 153 to 156; Chemical Week Buyer's Guide, Catalog Section (ALLIED A, B, C, D); Refinery Catalog, pages 169 to 172 (ALLIED A, B, C, D)

***ALLFLEX* Standard Stainless Steel Connectors are sold through leading Industrial Distributors. If not available locally—THEY CAN BE SHIPPED FROM FACTORY SAME DAY ORDER IS RECEIVED. (Also available in Monel, Bronze and Steel.)**

ALLIED METAL HOSE COMPANY

LONG ISLAND CITY 1, NEW YORK

ALLIED METAL HOSE COMPANY
3784 Ninth St., Long Island City 1, N. Y.
Please send full information on *ALLFLEX* to:

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

When inquiring check 4603 opposite last page

NEW SOLUTIONS

Valve lubricant data

Information on 80 new lubricants is provided in 12-page revised bulletin which lists detailed selection data for valve lubricants. Included is corrosion-resistant lubricant for strong acids and alkalis, alcohols, glycerine and glycols, amines, aqueous solutions, hot water, and hot asphalt. Bul V-220, Rev 1 — Meter and Valve Div., Rockwell Mfg. Co., Dept. CP, 400 N. Lexington Ave., Pittsburgh 8, Pa. Check 4604.

Ferric chloride corrosion stopped with titanium impeller shaft

Pump shafts of other materials lasted 45 minutes

Problem: Pumps leaked after 45 minutes of operation pumping ferric chloride used in etching printed circuits. Corrosive nature of this acid salt solution caused excessive wear of impeller shafts, tight seal was lost, and leaking began.

Special ferrous and nonferrous alloys were tried. Plated shafts using nickel, silver, and rhodium also were evaluated. None could extend useful pump life to more than 45 minutes.

FOR MORE INFORMATION

Here's what to do when you want additional details about products and services mentioned in this issue's editorial articles or advertisements.

Note the number at end of article or advertisement. Check this key number on Reader Service Slip opposite last page of this issue. Fill in Slip with the other pertinent information (name, title, company, address, product made). Mail to our Reader Service Department.

We'll contact the manufacturer for you. He'll send you the details direct.

SCAM SEQUENTIAL ANNUNCIATORS *Will Tell You!*

Scam sequential annunciator systems provide an audible and flashing visual signal on the first alarm to enable the operator of your control board to determine which point in the monitored process first becomes abnormal . . . successive alarms that develop from the original abnormal condition are indicated by a steady visual signal. You can take proper corrective measures immediately because you *know* where the trouble started.

Shown here is a typical standardized Scam DE-LINE cabinet featuring all the Scam advantages including simple, compact plug-in design. Integral flasher and reset push button can be provided.

If you've a process or system that needs automatic, fail-safe, low cost monitoring write us for literature or call the nearest representative in the cities listed below.

THE SCAM INSTRUMENT CORP.

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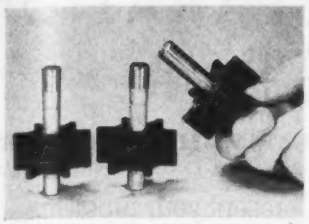
When inquiring check 4605 opposite last page



Titanium shaft (right) successfully withstood ferric chloride that caused alloy shafts (left) to fail in 45 minutes

Solution: Commercially pure titanium was tested as a material for impeller shaft. Since titanium was known to have excellent resistance to chlorides, good performance was expected.

Results: Pump ran 321 hours without developing a leak. It was then examined for damage that might lead to leakage, but none was found. A prototype unit, tested at an aircraft electronics plant, was so dependable that pump manufacturer made titanium shafted units a regular production item.

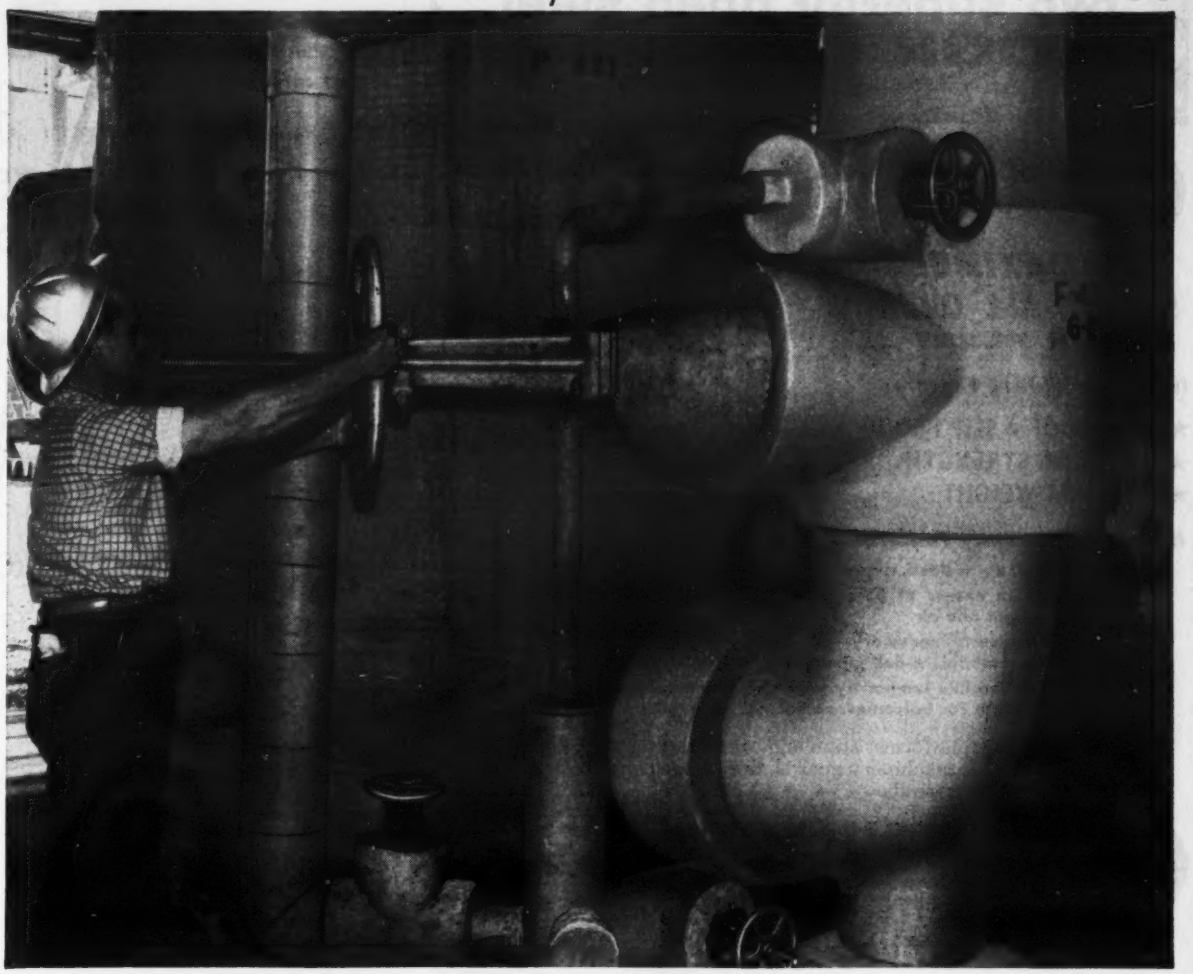
Initial cost of special shaft is offset in 90 minutes of successful pumping of corrosive ferric chloride solution.

(Titanium for pump shafts was supplied by Mallory-Sharon Titanium Corp., Dept. CP, Niles, Ohio. Check 4606 on form opposite last page.)

(Ferric chloride pump is a product of Jabsco Pump Co., Dept. CP, Burbank, Calif. . . . or for more information check 4607 opposite last page.)

"Nasty old door slam . . . eh, Doc??!"

Hard to Beat in Any Service—Crane Valves



Distinguished in Service on hard-to-hold fluid in petrochem processing

Some fluids by nature are appreciably harder to hold than others, even at low pressures and temperatures. One such fluid is cuprous ammonium acetate, being handled as shown here with a Crane 14-in. steel wedge gate valve.

This installation is at Petroleum Chemicals, Inc., a large butadiene plant at Lake Charles, La. Working pressure is less than 50 p. s. i. and the temperature is under 32 F°.

The low line pressure against the disc when closed, doesn't help much to keep the valve tight. Leakproof closure on the fluid depends entirely on the quality of bearing surface finish, the preciseness and accuracy of disc travel, and resistance of seating members to corrosion.

That's how this Crane 47X gate valve has been holding tightly on this penetrating fluid since 1944, with still no sign of seat leakage. And the only maintenance given it has been routine repacking at turnaround every one or two years.

That's the kind of quality Crane puts into valves for every need. Get the facts from your Crane Representative.

IDEAS FOR YOU in the 36 pages of "Valve Performance Facts." Ask your Crane Man for a copy, or write to address below.

CRANE VALVES & FITTINGS

PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

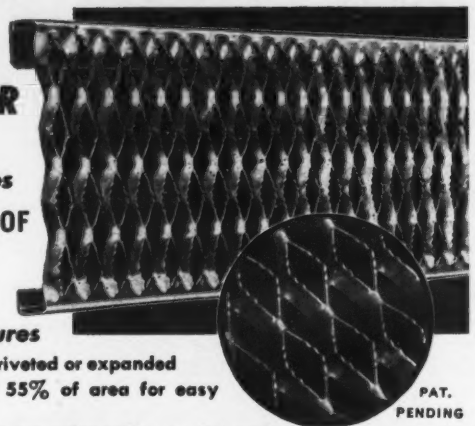
When inquiring check 4608 opposite last page

two superior open steel FLOOR GRATINGS

BY GLOBE

1 Safety GRIP-STRUT®

FOR MAXIMUM SAFETY ALL OVER YOUR PLANT



Important Safety Features

★ FIRE PROOF ★ SLIP PROOF
★ MAXIMUM STRENGTH
★ MINIMUM WEIGHT

Important Economy Features

★ All one piece, not welded, riveted or expanded
★ Open space in excess of 55% of area for easy access of light and air
★ No extra supports necessary—channels are integral part of the material. ★ Self cleaning
★ Cut and installed like lumber by your own maintenance force. ★ Low in original cost. ★ For balconies, no secondary sprinkler heads needed

PAT. PENDING

Ideal for work platforms, stair and ladder steps, flooring, balconies, catwalks, machinery guards, fire escapes and for original equipment safety treads.

2 GOLD NUGGET® WELDED grating

PAT. PENDING

The QUALITY GRATING for Heavy Duty Applications

★ ⅜" projection weld nugget for greater rigidity and strength
★ Vertical alignment of the main load bar assured
★ All bars are load carrying bars including secondary bars
★ Anti-skid pattern

PROJECTION WELD

Each secondary load bar (A), as projected welded to the primary load bar (B) has a shear strength of 5,000 pounds per weld. There are 28 such projection welds to a square foot of grating. This means that GOLD NUGGET Welded Grating can sustain greater shock loads than other gratings.

For the complete details of these revolutionary new gratings, write for new catalogs today. Distributors in all principal cities. Consult the yellow pages in your phone book under "GRATING".

108

PRODUCTS DIVISION

The **GLOBE** *Company* MANUFACTURERS SINCE 1914

4606 SOUTH PRINCETON AVENUE • CHICAGO 9, ILLINOIS

When inquiring check 4609 opposite last page

NEW SOLUTIONS

Neoprene-seated valves resist corrosion

Neoprene-seated valves are the only type found to give complete satisfaction in handling of saturated brine by Brine Service Co., Inc., Houston, Texas. Having been opened and closed from five to ten times per day while handling this highly corrosive liquid, some of these valves have given excellent service for over three years.

(Butterfly valve is product of Keystone Valve Corp., Dept. CP, 5325 Kirby Dr., Houston, Texas . . . or check 4610 opposite last page.)

(Neoprene is product of E. I. du Pont de Nemours & Co., Inc., Dept. CP, Wilmington 98, Del. . . . or check 4611.

Reinforced plastic resin decreases maintenance of tanning unit

No more wooden splinters to streak, tear, or mark hides

Problem: Wooden tanning equipment that splintered and leaked because of acid corrosion — causing streaked, torn, and marked hides, — meant costly replacement and maintenance at A. C. Lawrence Co., Peabody, Mass.

Solution: To overcome acid corrosion effects, pickle pit, coloring drum, and splash guards were fabricated from reinforced plastic resin in accordance with specifications from Lawrence Co.

CLEAN* SEPARATION

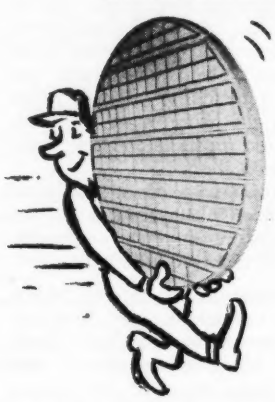
*99.9% plus *with*

YORKMESH DEMISTERS

(MIST ELIMINATORS, ENTRAINMENT SEPARATORS)

YOU present your problems...

YORK will recommend and deliver the answer



Why not take advantage of our vast experience in improving the performance of process equipment. In the past 10 years, the outstanding success of thousands of installations is proof of the superiority of YORKMESH DEMISTERS for entrainment control.

Yorkmesh Demisters are used to improve product quality, to avoid losses, and to increase thruput capacity. Our engineers will give careful consideration to the information you submit and will recommend the best answer to your problem.

YORKMESH DEMISTERS

improve the performance of:

Vacuum Towers • Distillation Equipment • Gas Absorbers • Scrubbers • Evaporators • Knock-out Drums • Steam Drums

YORK

OTTO H. YORK CO., INC.

6 CENTRAL AVE. • WEST ORANGE, N. J.

When inquiring check 4612 opposite last page

Hides do not become torn or mutilated in corrosion-resistant reinforced plastic resin tanks

Results: After more than one year of constant daily use, pickling unit still has not shown trace of corrosion from water, brine, and sulfuric acid pickle baths. Wooden splinters and leakage are no longer a problem. Hides do not become torn, streaked, or mutilated in any way in reinforced plastic tanks, shields, or paddle wheels.

(Bonate reinforced plastic resin is product of Carl N. Beetle Plastics Corporation, Dept. CP, 145 Globe St., Fall River, Mass. . . . or for more information check 4613 on form opposite last page.)

Save 2c per gallon on PVAc emulsion with inhibitor

Prevents corrosion of cans for water-base paints

Test performed by large chemical company supplying polyvinyl acetate emulsion primers for water-base paints have shown that a saving of 2c per gallon on finished paint is possible using a recently developed corrosion inhibitor, that combines both contact and volatile action, in place of former protection systems. Inhibitor prevents corrosion of cans below paint level, corrosion of can and lid above paint level, and corrosion of nail heads and metal trim when painted.

Three types of paints were involved: polyvinyl acetate, acrylic ester, and latex. Of

HOW CAN YOU
use this versatile material?

INTERNATIONAL'S 99.0+%

MAGNESIUM OXIDE

PELLET, POWDERED, OR GRANULAR FORM

AVAILABILITY

Immediate delivery in truck or carload quantities.

PURITY

Highest ever produced in process chemical quantities—Low Iron—Low Boron—Low Lime—Low Ignition Loss—Low Acid Insolubles.

PRICE

Lowest for this purity ever offered.

HAVE YOU CONSIDERED MgO FOR THESE OR OTHER USES?

★ **ALKALI PRECIPITATIONS** – Since acid insolubles are less than 0.1%, precipitants prepared from International's MgO are consistently high in purity. Stoichiometric, laboratory-controlled, one-stage additions to an exact pH are possible. Incremental additions by trial and error in the plant are thus eliminated. Our MgO achieves gradual pH adjustment with maximum crystal growth, resulting in higher filtration and washing rates. Elevated temperatures and flocculating agents become unnecessary. Available MgO? – greater than 99.0%.

★ **FUSED REFRACTORIES**

a) ELECTRICAL INSULATION – A nationally known research institute has proved the superiority of International's MgO. Initial resistance was shown to be consistently high. Life tests through 3600 hours proved insulation fused from International's MgO to have resistance measurement above other magnesias. Consider what this might mean in relation to rejects and failures.

b) BASIC REFRACTORY BRICK – Due to low lime and silica impurities, magnesite-chrome refractories made with International's MgO show high resistance to slag erosion. Ease of furnace feeding makes our pellet form ideal for this use.

★ **BLENDING WITH OTHER MAGNESIAS** – Adjustment of activity or bulk density with upgrade in purity is possible with International's unique MgO. Free flowing and slow hydration characteristics contribute to ease of handling.

LET'S TALK ABOUT QUALITY

Look at this typical analysis of just one of our high purity grades.

MgO – 99.5	Al_2O_3 – 0.04
SiO_2 – 0.05	CaO – 0.08
Fe_2O_3 – 0.06	Na+K – 0.05

Boron Range – 10 ppm to 100 ppm B
Powdered as fine as 90% minus 325 mesh

Technical data relative to the above are available upon request. Also for your experiments, we will furnish adequate samples of International's MgO in a grade suitable to your needs if you will indicate your area of interest.

International Minerals & Chemicals

potash division

INTERNATIONAL MINERALS & CHEMICAL CORPORATION • GENERAL OFFICES: 20 NORTH WACKER DRIVE, CHICAGO 6
485 LEXINGTON AVENUE, NEW YORK 17 • MIDLAND, TEXAS • FULTON NATIONAL BANK BLDG., ATLANTA, GA.

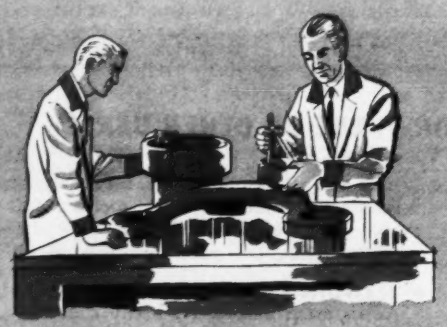
When inquiring check 4614 opposite last page

Are your castings suffering from **CRP***

* (Corrosion-Resistant Problems)

THE selection of precisely the *right* alloy for your corrosion-resistant castings may often be a very exacting problem. (For short, we call it CRP.) Or even procuring perfect, pit-free corrosion-resistant castings consistently in a production run may have given you trouble.

Those are two cases where it may profit you handsomely to turn to WAUKESHA for solutions. WAUKESHA has one of the finest metallurgical research and control laboratories in the country (probably the *finest* devoted entirely to corrosion-resistant alloys).



WAUKESHA offers you a remarkably wide choice of alloys. A number of these have been patented because no other formulations provide certain unique and critical performance characteristics.

WAUKESHA's plant facilities are large — one of the nation's largest. And an extensive addition is almost ready now. So WAUKESHA is able to meet your production schedules.

Two questions: Have you a "CRP" which our metallurgist can help you solve? A letter will bring immediate attention.

Or would you like to check and investigate a casting made to your specifications? Just send your pattern along.

WAUKESHA FOUNDRY COMPANY

5701 Lincoln Ave. / Waukesha, Wisconsin

When inquiring check 4615 opposite last page

NEW SOLUTIONS

these the PVAc was most critical due to formation of acetic acid by hydrolysis.

Corrosion-preventing product combines a water-soluble volatile amine salt component with a suitably buffered inorganic salt inhibitor. Recommended amount is 0.25% based on total paint weight.

In addition to lower cost possible, inhibitor is also easier to handle than previously used combination of morpholine and a di-isopropylammonium nitrite. Protection is equal or better. Inhibitor is supplied as a straw-colored, clear aqueous solution.

(Nox-Rust 702 inhibitor is a product of Daubert Chemical Co., Dept. CP, 333 N. Michigan Ave., Chicago 1, Ill. . . . or for more information check 4616 on form opp. last page.)

Steel services

Company's specialized services for steel and alloy industrial equipment are summarized in four-page bulletin. Stress relieving, X-ray inspection, hot-dip galvanizing, and finishing services are briefly described. Bul 501 — Koven Fabricators, Inc., Dept. CP, 90 E. Dickerson St., Dover, N.J. Check 4617.

Tank handles hot HCl and ferric chloride over 20 years

No degradation observed after this hard service

Hot hydrochloric acid and ferric chloride were unable to damage brick and rubber-lined tank during its 24 years of service. Vessel was used at Pennsalt Chemicals Co.'s Wyandotte, Mich., chemicals plant as a reduction tank. It was 20-ft in diameter and 6-ft deep. Unit was constructed of steel lined with 9-inch brick laid in acid-proof, silicate-type, quick-setting cement, then rubber lined.

Tank required no internal maintenance and very little external maintenance despite

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THERE IS A **Cleveland Vibrator**

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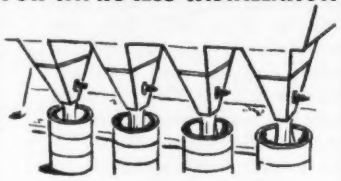
FOR INPROCESS INSTALLATION



FOR PACKAGING

and for all other bin applications in the handling of dry or viscous chemicals. Prevents bridging, plugging and arching — keeps chemicals moving — eliminates processing delays.

Write today for literature and engineering details.

Air or Electric

Portable or Permanent

Silent or Standard

2706 Clinton Avenue • Cleveland 13, Ohio

When inquiring check 4618 opposite last page

rough mechanical treatment and highly corrosive chemical contents. When dismantled to make way for a larger installation, tank was still in excellent condition.

(For more information on rubber-lined corrosion-proof masonry structures using acid-proof Penchlor cement contact Pennsalt Chemicals Co., Dept. CP, Three Penn Center Plaza, Philadelphia 2, Pa. . . . or check 4619 on form opposite last page.)

Neoprene guards purity of food seasoning, balks corrosion

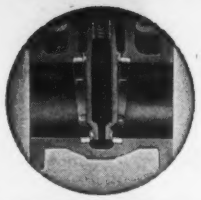
Stored product contains HCl

Five years service and no sign of deterioration is evident on neoprene lining of storage tanks used for monosodium glutamate containing muriatic acid. Tanks were put in service in 1951 at a large food product company in the Middle West and used continuously since.

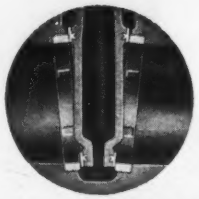
Storage tanks for monosodium glutamate plus dilute muriatic acid. Neoprene lining has been an effective corrosion barrier

Application of ⅛" thick neoprene sheet lining was made over sandblasted and primed steel surface and cured. Lining effectively protects purity of stored product by stopping corrosion completely and preventing any possibility of contamination.

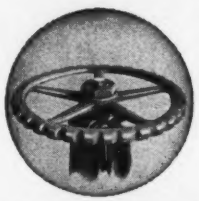
(Gaco N-350 neoprene sheet is a product of Gates Engineering Co., Dept. CP, Wilmington 99, Del. . . . or for more information check 4620 on form opposite last page.)



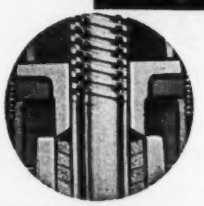
Straight-Flow Port Design reduces fluid turbulence to a practical minimum.



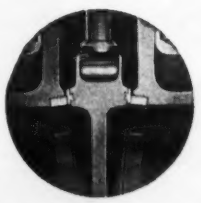
Seat Rings of end-seated type are screwed into the body.



Sure-Grip Malleable Handwheel for non-skid gripping even with heavy gloves.

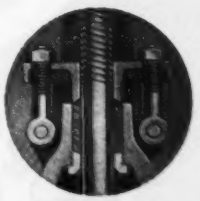


Brass Liner on Glands assures greater resistance to corrosion and scoring.



T-head Disc-to-Stem connection on OS&Y types provides stronger connection, prevents loosening of disc by corrosion.

Bronze Back-Seat Bushings in bonnets of OS&Y valves.



Hinged Gland Eye-Bolts on OS&Y valves permit faster, easier repacking under full pressure.

WALWORTH

iron body gate valves

with screwed or flanged ends

... 8 Outstanding Features

For complete information on these new Walworth Iron Body Valves, see your local Walworth distributor, or write for bulletin 106.

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When inquiring check 4621 opposite last page

precision
"Hair-splitting" is a kind of conversational precision hardly calculated to win friends and influence people.
At K&M, hair-splitting precision is more than a matter of talk.
For example, vital valve guides and bushings are precisely machined to a super finish of eight micro-inches or better.
But nobody takes anybody else's *word* for it. K&M's quality control men use a total of eight hundred and fifty-four separate dimensional tests in checking out each valve.
Sound like a lot? It is. Such meticulous precision is the kind of thing control engineers talk about when they get down to the business of specifying valves.
Many are convinced that K&M quality control means better, more accurate process control.
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KIELEY & MUELLER, INC.
diaphragm control valves
Our 78th Year
Oldest Pressure and Level Control Valve Manufacturer
64 Genung Street Middletown, New York

When inquiring check 4622 opposite last page

NEW SOLUTIONS

Silica brick treatment solves dust problem

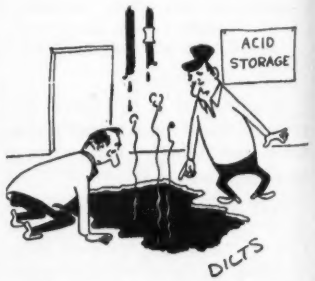
No adverse effect on brick life or refractoriness

Problem: Elimination of dust which resulted from handling silica brick used in electric arc furnace construction was major concern of Timken Roller Bearing Company, Canton, Ohio. Several materials were

Dip of 45 seconds in Orzan A solution gives silica brick resinous coating on all surfaces

tested to bind loose silica particles to brick surface to prevent dust concentration in air. Paint and plastics were discarded as too involved and expensive; oil was abandoned because of complications resulting from an oily surface.

Solution: Water solution of dry binder "Orzan A", a surface active lignin sulfonate, was used. Bricks in original stacks on pallets were dipped into solution of dry binder (1



"You see? I told you the tank was leaking."

Thanks to Joseph C. Dilts, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware

lb/gal water) for 45 seconds. Solution penetrated even innermost bricks and dried to dust-proof resinous coating around all surfaces.

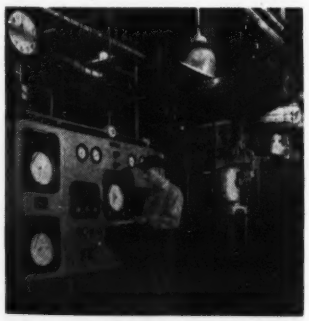
Results: Complete absence of silica dust in brick laying area was accomplished with no adverse effect on brick life or refractoriness. Cost of treatment was less than half cent per brick.

(Orzan A is product of Chemical Products Div., Crown Zellerbach Corp., Dept. CP, Camas, Wash. . . . or for more information check 4623 on form opposite last page.)

Glycerine output up 100% with new evaporator at Emery Industries

Double-effect unit replaces 4 single-effect evaporators

Glycerine production has been boosted 100% without any increase in floor space or production costs at Emery Industries, Inc., Cincinnati, Ohio. Costs, in fact, have actually been reduced. The new set-up is much more efficient and steam requirements per pound glycerine have been cut in two.



One man operates evaporator and associated equipment

All this was achieved when company replaced four single-effect, low capacity evaporators with one highly efficient double-effect unit. Evaporator is used to concentrate 12% "sweet water" from fat splitter into 60% glycerine. Unit has upped output

LOOKING FOR . . .
fume depressant?
surface active agent?
wetting agent?
an emulsifier?
acid inhibitor?

AKWEONS #674

. . . a new fatty acid derivative by Swift & Company

Akweons 674 is a versatile new fatty acid derivative which has demonstrated unique and outstanding properties in uses such as: a wetting agent, surface active agent, corrosion inhibitor, and emulsifier. Users report excellent results where it has been used as an acid fume depressant.

It is a dark reddish-brown liquid which pours readily at room temperature and is soluble in acidic, alkaline or neutral solutions.

Akweons 674 has found ready acceptance as an acid additive for pickling among steel producers and fabricators because, they say, it offers a trio of advantages found in few, if any, such product:

- *As an acid corrosion inhibitor*, Akweons serves to protect the base metal after scale and other contaminants have been removed.
- *It serves to minimize "sulling"* or flash rusting of the pickled steel after rinsing.
- *Akweons reduces noxious acid bath fumes* to promote better working conditions and serves to protect plant equipment by attacking corrosion at its source.

What can AKWEONS 674 do for you?

Because of its excellent surface activity at all pH values, AKWEONS 674 can be useful as a surface active agent or wetting agent, emulsifier or fume depressant. It should be particularly useful in acidic solutions in which most surfactants are ineffective.

This wide range of properties is available to offer new or improved process and product possibilities—perhaps for *you*. Swift & Company will be glad to provide details and a trial quantity for your evaluation. Just return the coupon or write for details.

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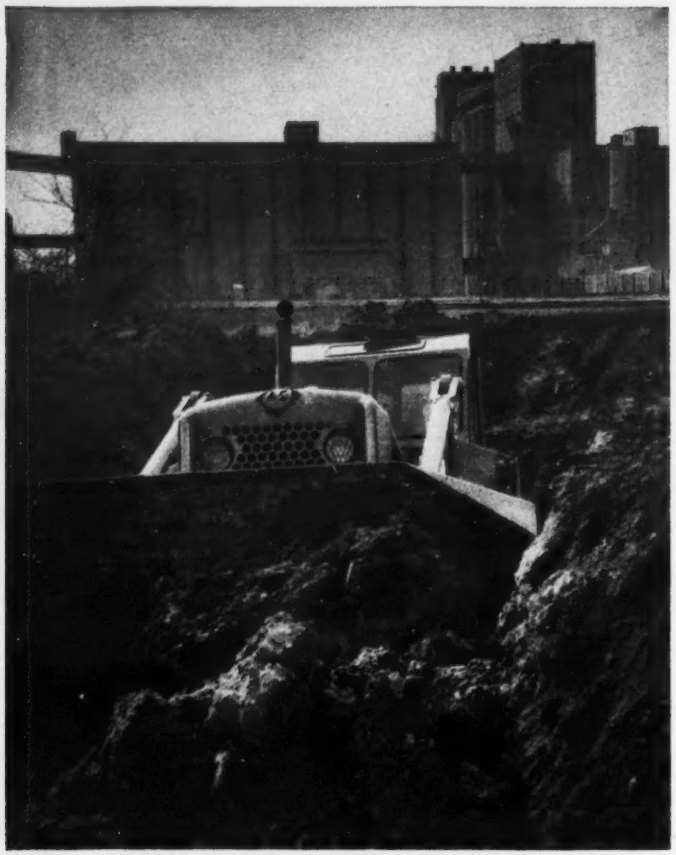
When inquiring check 4624 opposite last page

Staley solves waste disposal problem with an Allis-Chalmers tractor shovel



Cuts the trench. The first step in Staley's landfill system is to cut a trench. Their Allis-Chalmers HD-11G, with 111 net engine hp and a large-capacity hydraulic system, easily handles tough excavating. It is also mobile enough to carry excavated material to conveniently located stockpiles.

Adopts highly successful landfill system

Most plants have one by-product and one problem in common. The by-product is waste and the problem is how to dispose of it. Staley Manufacturing Company, Decatur, Illinois, disposes of both the waste and the problem with an Allis-Chalmers HD-11G tractor shovel.

By adopting the sanitary landfill system, this large manufacturer of soybean and corn products now disposes of refuse quickly and cleanly. There are no unsightly dumps . . . no hillside "smudgepots" . . . no breeding places for insects and rodents. Further, the system requires a minimum of man power and equipment. This picture story describes how one Allis-Chalmers HD-11G tractor shovel handles Staley's three-step landfill operation.

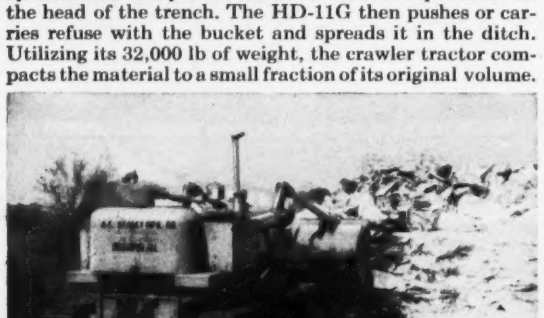
• • •

This versatile machine can help solve your waste disposal problem—and double as a material handling and yard maintenance machine. Write for free literature on all four sizes of tractor shovels from 1½ to 4 cu yd, or see your Allis-Chalmers construction machinery dealer.

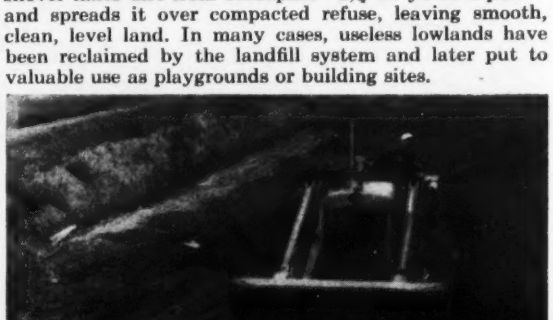
ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

Spreads and compacts refuse. A truck dumps refuse at the head of the trench. The HD-11G then pushes or carries refuse with the bucket and spreads it in the ditch. Utilizing its 32,000 lb of weight, the crawler tractor compacts the material to a small fraction of its original volume.



Seals it in forever. At the end of each day, the tractor shovel takes dirt from stockpiles—2¼ cu yd at a pass—and spreads it over compacted refuse, leaving smooth, clean, level land. In many cases, useless lowlands have been reclaimed by the landfill system and later put to valuable use as playgrounds or building sites.



When inquiring check 4625 opposite last page

from 1500 to 3000 lb per hr.

Operation is simple and automatic. One man operates evaporator and associated processing equipment. Feed enters unit at rate of 15,000 lb per hr. Preheater heats liquor before it enters first effect. Condensate from steam chest operates preheater.

High evaporation rate

Evaporator uses process steam at 7 to 10 psig. High rates of evaporation per sq ft of heating surface are attained with extremely low loss from entrainment in high velocity flow through evaporator tubes into the separators. Foaming is inhibited by the rapid concentration of material as it passes through the long tubes of the evaporator. Separators have built-in demisters.

Circulation is maintained by thermal differences. Feed rate and product discharge are controlled by air-operated differential pressure-type liquid level controllers. Simple adjustment permits operator to raise or lower liquid level to insure maximum operating results. Density of concentrated glycerine is held within close limits by controller.

The 60% glycerine product from evaporator is given an acid treatment to separate traces of residual fats, a lime treatment to neutralize the acid, and is then filter pressed to remove lime and other impurities. Final product, 90% glycerine, is produced by further evaporation.

(Double effect, vertical rapid concentration evaporator was designed and built by Buflovak Equipment Division, Blaw-Knox Company, Dept. CP, Farmers Bank Building, Pittsburgh 22, Pa. . . . or for more information check 4626 opposite last page.)

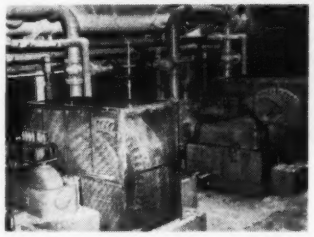
What's all this about "Executive Size" . . .?

Look opposite page 87

Oiling costs cut 40% with acid-resistant lubricant

Problem: Vacuum pump maintenance and lubrication was a costly proposition at a large domestic chemical plant. Over $200 worth of parts had to be replaced each month because valve seats, cylinder walls, and pistons were not protected from the corrosive sulfuric acid-laden air that was drawn into the cylinders of the 11 vacuum pumps in the plant. Valve stems often dried and stuck. Once a week, sludge had to be chiseled off.

Solution: Company switched from conventional vegetable-mineral oil lubricant to a special acid-resistant. Known as Keystone 2K-6, it is practically colorless, odorless, and tasteless. It has approximate SAE No. 250.



No parts have been replaced on vacuum pumps since company switched to new lubricant

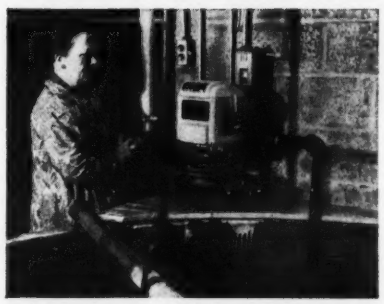
Flash point is 340°F. Cold test is 25°F. Material is insoluble in water, resists oxidation, is acid-free, and will not gum.

Results: Maintenance problem has been whipped. No parts have had to be replaced since the first application of the lubricant — over 18 months ago. Lubrication costs have been reduced by more than 40 percent. Previous oil sold for only 1/3 the price of the new oil, but was consumed five times as fast.

Gum and carbon formations are also gone. Lubricant never washes off, valve stems and cylinders no longer stick.

(Keystone 2K-6 lubricant is product of Keystone Lubricating Company, Dept. CP, 21st, Clearfield & Lippincott Streets, Philadelphia 32, Pa. Check 4628 opp. last page.)

ONLY TWO MOVING PARTS IN THE LIQUID



New Neptune stainless steel meter accurately measures sulfuric acid at Parwel Mfg. Co., Gloversville, N. Y.

Now you can achieve fine-instrument accuracy in the processing of corrosive liquids . . . in batching, blending, transfer, cost accounting, etc. . . . with this new Neptune Stainless Steel Meter.

Also important in processing applications, this Neptune meter ends many problems caused by contamination of liquids measured.

Based on the reliable Neptune positive displacement principal, its accuracy is completely protected from the effects of corrosion or corrosive wear. There are only two moving elements in contact with the liquid. The gear-train is mounted outside the casing, isolated from the liquid.

Available with Direct Reading, Print-O-Meter or Auto-Switch Registers. Size 1½", capacity 100 gpm. with most liquids.

Ask for Bulletin 94/10 N P.

neptune

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When inquiring check 4629 opposite last page

Lithium remains liquid from 179°C to 1317°C. Here it is poured into an ingot mold at a temperature of about 350°C

Lithium is aptly called "the element with a dual personality." Lightest of the alkali metals, lithium differs from the others, resembling, in many ways, alkaline earths: magnesium, calcium, strontium, and barium.

The inconsistencies in lithium's behavior — coupled with the metal's low atomic weight and relative abundance — fire the imagination with possible applications.

Already the metal plays an important role in industry (see CHEMICAL PROCESSING, May 1957, pp 12-13), but this is merely the beginning.

Let's take a look into the future for —

LITHIUM: the element with a dual personality

DR. RALPH VERDIECK
Manager, Chemicals Research
Foote Mineral Company
Philadelphia, Pa.

Agriculture — Lithium may fulfill the dream of agronomists and plant pathologists for a general systemic fungicide for plants. Lithium ion alters the pathology of growing plants, renders them resistant to fungus diseases. When 10 to 20 ppm is added to soils, 95% control of early celery blight is obtained. Neither sodium nor potassium give this effect.

Although experiments have been primarily concerned with celery, similar results could be expected in other crops. For example, it also combats chestnut blight.

Use of lithium as a trace element is also being studied. Growth of wheat, barley, lettuce, and tomatoes is stimulated.

To date, these results are little known beyond the gates of agricultural research stations. As world-wide problems of food production and plant disease control become more acute, lithium salts should become very important to world agronomy.

Nuclear energy — Lithium could be a more economical source of nuclear energy than uranium or thorium. In addition none of its by-products are radioactive. Lithium-7, the normal form of the element, undergoes non-self-sustaining fusion when bombarded with protons. It has a low neutron cross-section and shows promise as a pile coolant. Lithium-6 undergoes fusion when combining with tritium. In addition, it absorbs neutrons readily as it has a high neutron cross-section.

If the market for these isotopes develops, separation would be easy and economical — much more so than that of U^{235} and U^{238} which have small relative differences in atomic weight. At present the AEC is the only user of Li^6.

High energy fuels — Lithium is the lightest combustible element next to hydrogen. It is not hard to visualize applications combining lithium and hydrogen in this age of rocket propulsion where fuel weight (and not cost) is the most important consideration. Such uses are in the future, and are definitely classified.

Heat exchange medium — In present thermonuclear reactors, lithium metal could be used as a heat exchange medium between the reactor and exchangers which supply steam for the turbines.

Lithium's heat capacity and liquid range

are better than the the other alkali metals or their alloys. The high boiling point of lithium (1317°C) permits use in the liquid phase at extreme temperatures. Some problems in corrosion must be solved before lithium becomes the "ideal" medium, but these solutions should be soon coming.

Catalyst — The coming field of isotactic (controlled molecular structure) polymers has shown the value of lithium as a catalyst. While most catalysts give random polymerizations, lithium (and a very small number of other metals), give specific isomers. Probably the most publicized of these products is "synthetic natural rubber." Use of lithium dispersions give a 95% conversion to the cis-isomer.

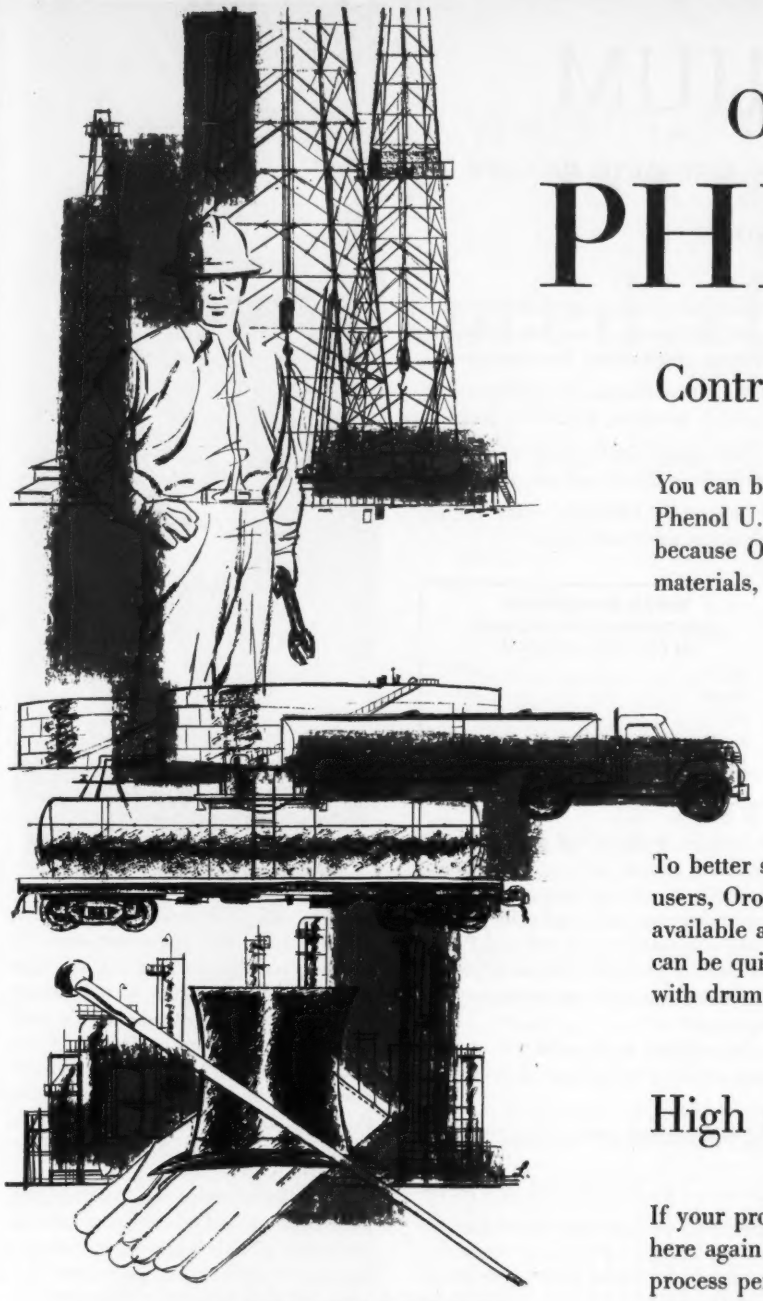
There are many catalytic processes in which uniformity of end product is hard to maintain. Chemists who have studied the properties and behavior of the many combined forms of lithium believe that the secret of catalytic control will be found here, as lithium gives remarkable control in coupling organic molecules and in altering crystal structure.

Organic chemistry — New antibiotics and other "wonder drugs" not yet discovered may be synthesized by using lithium hydride and lithium alu-

Turn to next page

DR. RALPH G. VERDIECK joined Foote Mineral's research and development staff in 1948 and is now manager of chemicals research. Prior to joining Foote, he taught chemistry and electrical engineering at a midwestern college.

He received his Masters and Ph.D. degrees from St. Louis University, having previously earned his bachelors degree in chemistry from Regis College in Denver, Colorado. Verdieck's specialty is the electrochemistry of aqueous and fused salt baths.



Oronite®

PHENOL

Control of raw material

You can be assured of Oronite as a dependable Phenol U.S.P. source, now and years ahead, because Oronite has complete control of raw materials, starting with crude petroleum stocks.

Complete distribution

To better serve Eastern and Midwestern Phenol users, Oronite has bulk distribution terminals available at key consuming points. Consumers can be quickly served by tank car, tank truck or with drum shipments.

High quality

If your process requires a highly pure product, here again Oronite's advanced manufacturing process permits consistent high quality Phenol to meet your requirements.

ACETONE

Oronite Acetone is co-produced with Phenol in the world's most modern plant, employing the newest manufacturing process and equipment. Unsurpassed in quality, Oronite Acetone is available nationwide in tank cars, tank trucks and drums.

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4349

When inquiring check 4630 opposite last page

DIDYMIUM

A plentiful and economical rare earth mixture

a report by LINDSAY

You have often watched a welder at work, watched briefly that is, because the intense glare, even at a safe distance, forced you to turn your eyes away. And you wondered perhaps how it is that a welder, even with protective goggles, can focus his eyes on a welding spot for minutes at a time.

The secret, of course, is *Didymium*. The lenses in the welder's goggles, and in the glass blower's goggles, too, are made with didymium which completely absorbs yellow sodium light, thereby reducing glare and eye fatigue.

WHAT IS DIDYMIUM?

In 1842, a European chemist named Mosander separated from a crude rare earth mixture some material he called "didymium." He thought it was a new element. Actually it was a mixture of rare earths predominantly neodymium and praseodymium. Classically, didymium means a mixture of Nd and Pr. However, commercially, the name didymium is restricted to the cerium-free group of rare earths extracted from monazite ore, since the composition of the mixture is reasonably constant.

Didymium is the basic material from which all the other rare earths except cerium are produced. Lindsay produces didymium in various forms for different applications. For example:

Didymium Carbonate—pink powder, insoluble in water, soluble in acids.

Didymium Oxide—brown powder, insoluble in alkalis, soluble in acids.

Didymium Chloride—pink lumps, soluble in water and acids.

TYPICAL APPROXIMATE COMPOSITION OF RARE EARTHS IN DIDYMIUM MATERIAL

La_2O_3	45%
Nd_2O_3	38%
Pr_6O_{11}	11%
Sm_2O_3	4%
Other rare earths and yttrium oxides	2%

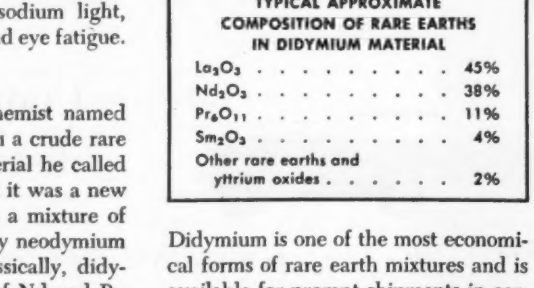
Didymium is one of the most economical forms of rare earth mixtures and is available for prompt shipments in carload quantities. It is useful for the coloring characteristics of Nd and Pr and for some of the other rare earth properties where purity is of secondary importance.

In addition to its extensive application in the production of lenses for welders' and glass blowers' goggles, didymium has other important uses. In coloring and decolorizing of glass. As a porcelain coloring agent. In light filters for calibration of instruments. To control the temperature coefficient of capacitance in barium-titanate ceramic condensers for radio and electronic use (U.S. Pat. 2,398,008). In stainless steels which are forged hot (U.S. Pat. 2,553,330).

We'd like to tempt you to investigate didymium and other rare earth salts as possible materials for use in your chemical and manufacturing processes. The very fact that important companies in a wide cross-section of industry, through their own research, have discovered profitable applications for the rare earths may intrigue your own research people.

We can be helpful to you and will be pleased to supply any information we can. Please keep in mind that we produce rare earths in purities up to 99.9% and higher in some cases (which is an achievement in itself). Shipments, depending on the salts you may need, can be made to fit your schedules in quantities from a gram to a carload.

Absorption Spectrum of **DIDYMIUM CHLORIDE SOLUTION** *from monazite containing 1 g. rare earth oxide/100 ml. compared with water in 5 cm. cells*



PLEASE ADDRESS INQUIRIES TO

LINDSAY CHEMICAL COMPANY

288 ANN STREET • WEST CHICAGO, ILLINOIS

When inquiring check 4631 opposite last page

Lithium

Starts on page 122

minum hydride as specific reducing agents. For example, synthetic vitamin A and certain histamines have been made by this route.

Pigments — Lithium can be used to promote formation for rutile titanium oxide. Effective forms of other pigments may also result if they are crystallized in presence of a lithium salt.

Electrochemistry — Because the lithium ion is very small, highly hydrated, mobile, and complexes with other ions, it is ideal for electrochemical uses. When sodium or potassium cyanide is replaced by lithium cyanide, copper can be plated twice as fast and without loss of smoothness or brilliance.

The effect may also be exploited to increase the efficiency of "electro-winning" of copper, zinc, nickel, and other refined metals.

In fused-bath processes, lithium halides up electrical conductivity and lower melting temperature of the bath. For example, the effect of these salts in the Hall aluminum refining cell is to allow higher current densities and increase the deposition rate.

If it works with aluminum, why would it not work in magnesium, titanium, or zirconium refining when these metals are derived from fused salts? This should be investigated.

Lithium alloys in metallurgy — The primary practical metallurgical use for lithium is as a degassifier for copper and its alloys. Future use of lithium as an alloying agent may be in high-tensile strength magnesium-lithium alloys. Other potentially useful alloys may be those with aluminum or silver.

Lithium in glass and ceramics — the high charge density of the lithium ion gives it unique properties in producing glasses and ceramic materials having these properties: low thermal expansion, low melting point, high resistance to chemical attack, and reduced tendency to hydrolyze.

A bright new world — Lithi-

um applications already make a lengthy list, but the end is not even in sight. Although a rarity some dozen-or-so years ago, lithium is now being produced at an annual rate which ranges from 23 million to 42 million pounds of lithium carbonate equivalents, according to various estimates.

It would be rash to assume that the element has reached its zenith in any field. As demand increases and production goes up, orderly price reductions should take place, making lithium even more economically attractive. ■

Single metal crystals and polycrystals produced

Low price on many metals, sizes, orientation

Uses: For study of properties influenced by crystal anisotropy or presence of grain boundaries.

Features: Single crystals and polycrystals of many metals are commercially available at lower prices.

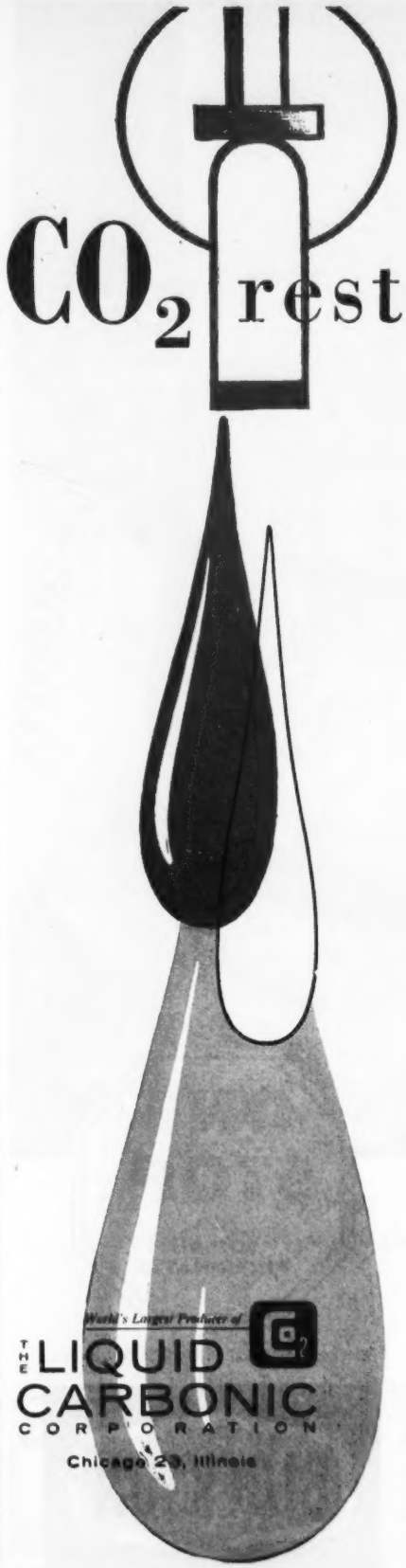
Description: A broad range of purities, crystal orientation, and overall size is available. Surface may be as-grown, etched, or electropolished.

(Metal crystals are available from Flow Corp., Dept. CP, 85 Mystic St., Arlington, Mass. . . . or for more information check 4632 opp. last page.)

Strength, clarity combined in medium-impact styrene compound

Medium-impact styrene molding material with improved transparency for applications in packaging field requiring more impact strength than general purpose styrenes, but greater clarity than high impact styrenes.

(Lustrex LHA Natural is product of Plastics Div., Monsanto Chemical Co., Dept. CP, Springfield, Mass. . . . or for more information check 4633 on form opposite last page.)



WHEN TAPS SLOWED TO A TRICKLE

CO_2 restored the flow

A few years ago the water taps in one of our midwestern cities began to flow too gently. City engineers suspected the culprit was excess lime.

In the lime-soda ash process of water treatment it is customary to over-treat the water to assure maximum softening. This causes plugging of the water lines due to precipitation of the excess lime.

CO_2 SOLVES THE PROBLEM

Recarbonation of the treated water with CO_2 changed the lime to a more soluble form—and water pipes stayed free-flowing. The CO_2 system is successfully solving the lime problem in cities like Minneapolis, Minn., Columbus, Ohio, Eau Claire, Wis. and many other municipalities.

This is just one of hundreds of CO_2 applications that may lead you to a solution to one of your problems.

IS THERE A JOB FOR CO_2 IN YOUR PLANT?

Almost every day another manufacturer or processing plant finds that carbonic gas can improve the product, simplify an operation, cut cost, or increase safety.

CO_2 is now doing a job in such varied applications as these:

Curing cores and molds for foundry castings
Making possible low cost gas shielded welding
De-flashing molded rubber products quickly at low cost
Improving paints and varnishes
Freeze-drying pharmaceuticals
A low cost, safe, weak acid for neutralizing
As an inert atmosphere to prevent fire and explosion
And hundreds of other applications

Some of these may be of direct interest to you, others may be adaptable to your field. If you'd like a broader list, we'll be glad to send you our booklet "CO_2 Applications Unlimited". Just check it on the coupon below. If you'd like detailed technical data on any of the applications listed in this advertisement, check those in the coupon too.

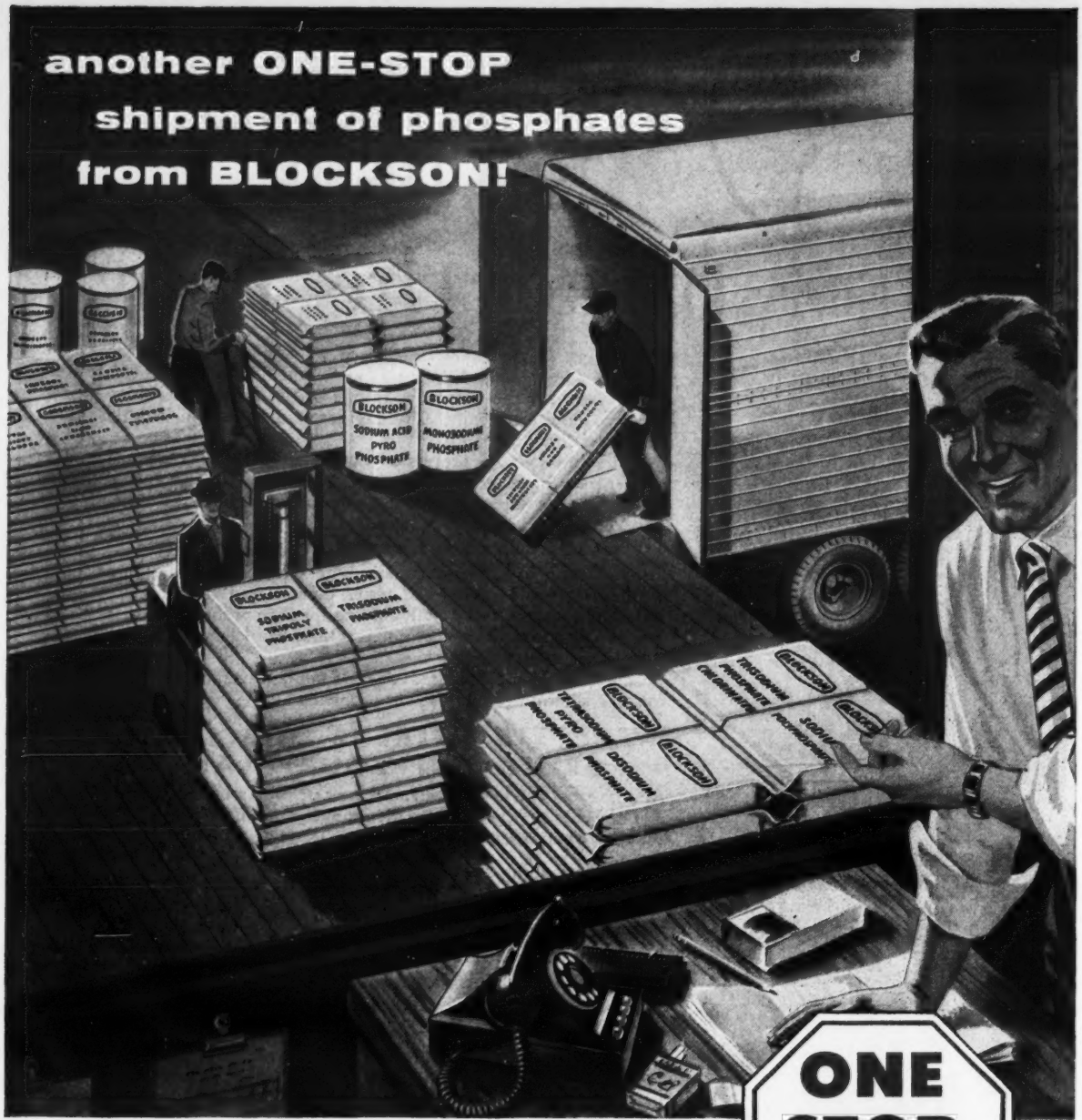
☐ Curing Cores and Molds
☐ Rubber Tumbling
☐ Freeze-Drying
☐ Gas Shielded Welding
☐ Paint and Varnish Manufacture
☐ Other _____

THE LIQUID CARBONIC CORPORATION
3124 South Kedzie Avenue • Chicago 23, Illinois

Please send me a copy of "CO_2 Applications Unlimited" plus detailed information on the indicated uses of CO_2.

Name _____
Title _____ Company _____
Address _____
City _____ Zone ____ State _____

When inquiring check 4634 opposite last page



ONE STOP FOR SODIUM PHOSPHATES

SIMPLIFY YOUR PURCHASING... ORDER YOUR PHOSPHATES from Blockson in mixed car or truckloads • carload price on each chemical • one stop delivery • one collect phone call for all schedule changes • Think it over.

Warehouse Stocks at all Blockson Distributors

BLOCKSON CHEMICAL COMPANY • Joliet, Ill.

Division of Olin Mathieson Chemical Corporation

Sodium Tripolyphosphate • Trisodium Phosphate • Tetrasodium Pyrophosphate • Tetrapotassium Pyrophosphate • Sodium Polyphos (Sodium Hexametaphosphate-Sodium Tetraphosphate) • Sodium Acid Pyrophosphate • Trisodium Phosphate Chlorinated • Disodium Phosphate • Monosodium Phosphate • Hydrofluoric Acid • Sulfuric Acid • Sodium Fluoride • Sodium Silicofluoride • Hygrade Fertilizer • Teox 120 (Nonionic Surfactant).

When inquiring check 4635 opposite last page

High-mw polyethylene makes a rugged pipe that'll hold solvent

Permits higher working temp and pressure

Uses: For making a polyethylene pipe that can carry solvents and hydrocarbons, and can be used at higher working temperature and pressures than pipe made from conventional polyethylene.

Features: Resin makes pipe having high burst strength, impact resistance, absence of stress cracking, superior heat resistance, and resistance to chemicals, organic solvents, and liquid hydrocarbons. Finished pipe won't slit or pinhole and has exceptional creep resistance.

Description: A-C Polyethylene Pipe Compound is a low-pressure polyethylene resin made by a process which yields an extremely high molecular weight. Compounded with carbon black, pipe resists deterioration by UV-rays. Finished pipe is somewhat less flexible than conventional polyethylene, but is easily coiled and laid.

Finished pipe exceeds requirements of Commercial Standard tests CS197-57 for Series 1, 2, and 3 Pipe. Physical properties are:

Tensile (psi @ 75°F)	3480
Elongation (% @ 75°F)	600
Flex (psi @ 75°F)	3700
Impact (ft lb/in notch @ 75°F)	12½
Sp gr	0.95-0.96
Mw (avg.)	>750,000
Crystalline melting point (°F)	257
Brittle temp (°F)	<120
Coef. of thermal expansion (10^{-5} in/in/°F)	9

(A-C Polyethylene Pipe Compound is a product of Allied Chemical & Dye Corp., Dept. CP, 61 Broadway, New York 6, N.Y. Check 4636 opposite last page.)

(SP Plastic Pipe is a product of Orangeburg Manufacturing Co., Dept. CP, Orangeburg, N.Y. . . . or for more information reader may simply check 4637 opp. last page.)

Yellow vegetable color is safe, effective, economical

Uses: For coloring cosmetic and pharmaceutical items.

Features: Color ranges from light yellow to rich orange. Product is safe, stable, uniform, and compatible.

Description: Color is made from annatto seed. It comes in both oil-soluble and water-soluble types in microcrystal, powder, and liquid forms. The liquids are true solutions.

(Anattene is a product of S. B. Penick & Co., Dept. CP, 50 Church St., New York 8, N.Y. . . . or for more information check 4638 opp. last page.)

About aerosols

Information on chemical and physical properties of synthetic organic insecticide for aerosol application is contained in 12-page bulletin. Formulation recommendations, specimen labels, and biological performance data are included. Form SAN-404 — Rohm & Haas Company, Dept. CP, Washington Square, Philadelphia 5, Pa. Check 4639.

"I can't pronounce it, so I'll have to spell it . . . NH_2CH_2COOH."

Thanks to Joseph C. Dilts, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware

Still another *research tool* from Lithium Corporation...

LITHIUM METAL

(LOW SODIUM CONTENT)

The latest from L.C.A.

Following on the heels of the discovery that lithium metal dispersions make unique polymerization catalysts (isoprene polymerized to a synthetic rubber which closely resembles natural rubber) comes recent interest in organolithium compounds as reagents for commerical uses. The preparation of these compounds often requires metallic lithium as the source of the lithium atom. This suggests that a lithium metal of low sodium content (0.005% maximum) may be advantageous, research-wise, in developing laboratory experimentations into possible commercial processes. Atomic energy holds still further possibilities.

This refined grade of lithium metal, as well as the commercial grade, is available in experimental and commercial quantities in the following physical forms: ingot, cup, rod, wire, ribbon, shot and dispersions in suitable media.

Got a catalyst problem? Investigate the practicability of lithium metal. Your request on company or institutional stationery will receive prompt attention.

. . . trends ahead in industrial applications for lithium

LITHIUM CORPORATION OF AMERICA, INC.
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member of...

PROCESSORS OF LITHIUM METAL • METAL DISPERSIONS
METAL DERIVATIVES: Amide • Hydride
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SPECIAL COMPOUNDS: Aluminate • Borate • Borosilicate • Cobaltite • Manganite
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BRANCH SALES OFFICES: New York • Chicago • Bessemer City, N. C.
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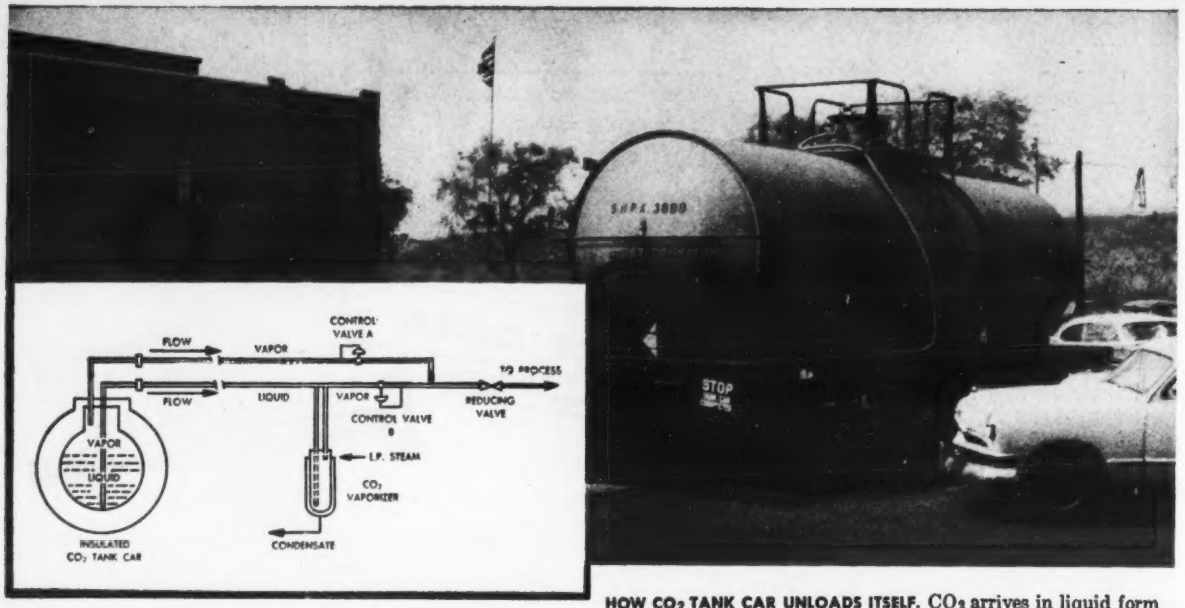
PLANTS: St. Louis Park, Minnesota • Bessemer City, N. C.
RESEARCH LABORATORY: St. Louis Park, Minnesota

When inquiring check 4640 opposite last page



HOW CO_2 TANK CAR UNLOADS ITSELF. CO_2 arrives in liquid form with vapor pressure of less than 300 lbs. psig. Diagram at left shows how automatic unloading system sends CO_2 vapor directly to process. (Control valve A is open when line pressure is 220 lbs. psig or higher. Valve B is open below 200 lbs. psig.) Photo courtesy of Pfister Chemical Works in Ridgefield, New Jersey.

CO_2 goes directly from tank car to process...

- **eliminates expensive storage and refrigeration**
- **no need to handle CO_2 cylinders or convert dry ice**
- **cuts down maintenance and upkeep**
- **reclaims valuable plant space or land**
- **assures constant CO_2 flow that matches demand**

Here's a remarkable, new, exclusive method of handling CO_2 shipments that may prove profitable to many users of carbon dioxide. It's Olin Mathieson's patented *Direct Unloading System—CO_2*, in which CO_2 vapor flows directly from special, insulated tank cars to your process ...at rates of from 6 to 1500 lbs. per hour, varying directly with the demand.

This new system bypasses intermediate steps such as storage in refrigerated tanks, handling of cylinders, or converting dry ice, along with the expensive, extensive facilities that these require.

Completely automatic, this method requires no power—only a small, low-pressure steam line. The distance from spur to plant is generally immaterial. Olin Mathieson installs and maintains the system and leases the cars to you so that no demurrage occurs.

Direct unloading prevents any venting as long as CO_2 is used in process, while an uninterrupted flow is maintained by connecting the coupling stations in parallel along the spur. This allows a balanced switchover from emptying tank cars to full ones.

On-time shipments are assured by Olin Mathieson's CO_2 plant at Saltville, Va.,—the world's largest—and by Olin Mathieson's fleet of 24- and 30-ton insulated tank cars.

Direct Unloading System—CO_2 can be installed in a matter of weeks. Why not contact Olin Mathieson soon to see whether it can be profitably adapted to your operation.

4728

MATHIESON

MATHIESON CHEMICALS
OLIN MATHIESON CHEMICAL CORPORATION
INDUSTRIAL CHEMICALS DIVISION · BALTIMORE 3, MD.

When inquiring check 4641 opposite last page

Non-tacky coating results when amide is utilized as anti-block agent

Useful as paint thickener, slip agent for resin films

Uses: As anti-blocking agent for vinyl copolymer lacquers; thickening agent for flammable paint and varnish removers; and slip agent for baked resin films.

Features: Makes a dry, tack-free lacquer coating. Improves "slip" properties for film surfaces. In coating paper with vinyl copolymer lacquers, addition of 5% (wt on total solids) of Lauramide C will result in non-tacky coating.

Description: Chemical, physical properties:

Free fatty acid (max)	8
Iodine value (WIJS)	11-15
Color (Lovibond 1/8" Y/R)	26/10
Solidification point (°C)	80
Specific gravity @ 25°C	0.98

(Lauramide C is product of Aceto Chemical Co., Inc., Dept. CP, 40-40 Lawrence St., Flushing 54, N.Y. . . . or for more information check 4642 opposite last page.)

Versatile textile softener is highly compatible

Cationic substantive shows anti-static properties

Uses: As a textile softener.

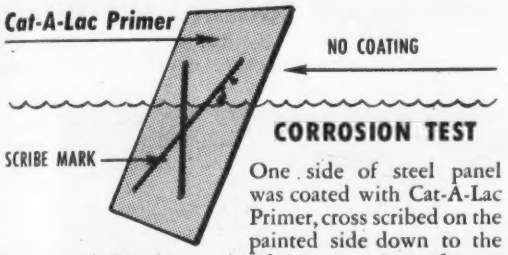
Features: Confers anti-static properties to Darlan when applied by substantive application. It is easily soluble in warm water, low foaming, compatible with most resin catalysts.

Description: Cationic substantive softens synthetic and natural fibers, and does not decrease tear strength or lower crease resistance. It resists washing and aging, will not contribute to chlorine-retention damage.

(Ahcovel X57 is product of Arnold, Hoffman & Co., Inc., Dept. CP, 55 Canal St., Providence 1, R. I. . . . or for more information check 4643 on form opposite last page.)

Tests prove *Cat-A-Lac Primer* protects against CORROSION

Extensive immersion and "Salt-Spray" studies have proven Cat-A-Lac Corrosion Inhibiting Primer No. 454-1-1 to be at least three times more effective in combating metallic corrosion than any known specification primer. Tests were conducted on aluminum, magnesium, steel and zinc.

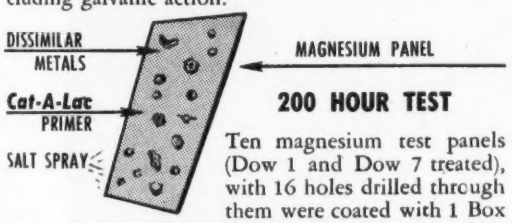


CORROSION TEST

One side of steel panel was coated with Cat-A-Lac Primer, cross scribed on the painted side down to the bare metal. Panel was placed in a container of water and kept immersed for one year. The uncoated side and the metal exposed due to scribe marks showed no sign of rust.

Cat-A-Lac protects against GALVANIC ACTION

Cat-A-Lac Primer has been proved superior by far in protective qualities against all types of corrosion, including galvanic action.



200 HOUR TEST

Ten magnesium test panels (Dow 1 and Dow 7 treated), with 16 holes drilled through them were coated with 1 Box Coat Cat-A-Lac Primer No. 451-1-1 and 1 Box Coat of Cat-A-Lac Lt. Gray No. 443-1-2. Into these drill holes, sixteen various dissimilar metal fasteners were placed. They included bolts, nuts, washers, flat head bolts, wing nuts, etc. The dissimilar metals were steel, aluminum, brass, copper and the magnesium base panel. The exposed surfaces of the various fasteners were then daubed with the primer and top coat. The test panels were exposed to salt spray for 200 hours. A perfect score would be 160 (1 point for each dissimilar metal contact).

Result: Cat-A-Lac Primer 139*. 12 other systems were tested. The next closest system (a 3-coat system) scored 68.

**The failure points in the Cat-A-Lac system occurred only around the counter-sunk flat headed bolts, where the primer had been scratched away in tightening. These were re-coated and tested again with no erosion . . . score 160.*

Write for your free "Finch Facts" Brochure

FPC **FINCH PAINT & CHEMICAL CO.**

1536 W. 228th Street, Torrance, California

When inquiring check 4644 opposite last page

Higher alkyl phenol should find uses as intermediate

Uses: Intermediate for nonionic surface-active agents, lube oil additives, and ethoxylated products. Can be starting point for many plasticizers, resins. Other uses include anti-oxidants, anti-skinning agents.

Features: Higher alkyl phenol is insoluble in water and dilute caustic solutions, soluble in most organics.

Description: Nonyl phenol is a mixture of mono alkyl phenols and is predominately parasubstituted. A viscous, pale yellow liquid, it distills between 294-298°F (5-95%) and has a sp gr (@ 20°C) of 0.950. Hydroxyl value is 250-255, flash point (Toc) is 300°F, and refractive index (@ 20°C) is 1.513.

(Nonyl phenol is a product of The Stepan Chemical Co., Dept. CP, 20 N. Wacker Dr., Chicago 6, Ill. . . . or for more information check 4645 on form opposite last page.)

Sequestering agents for water treating, other uses

Series of sequestering, chelating, and complexing agents are used in water softening and in other uses where alkaline earths and heavy metal ions must be arrested or sequestered.

(Monaquests are products of Chemical Div., Mona Industries, Inc., Dept. CP, Paterson 4, N.J. . . . or for more information check 4646 on form opposite last page.)

Molded plastics booklet

Molding, finishing and assembly of components, research, and quality control are covered in 12-page booklet on molded plastics. "Custom Molded Plastics for Industry" — Sylvania Electric Products Inc., Dept. CP, Warren, Pa. Check 4647.

TENNESSEE CORPORATION

INDUSTRIAL CHEMICALS

We mine Copper, Sulfur, Iron and Zinc and are basic producers of their chemical derivatives. Our technical know-how and basic position in these minerals is your assurance of exacting quality control, strict uniform consistency and a plentiful supply.

COPPER

COPPER SULFATE
Industrial Crystals and all common grades.

MONOHYDRATED COPPER SULFATE
35% Copper as metallic packaged in steel drums at no extra cost.

COPPER CARBONATE
55% Copper as metallic. Light and dense grades.

CUPRIC CHLORIDE
37% Copper as metallic. Available in polethylene-lined drums or bags.

CUPRIC OXIDE
Minimum 76% Copper as metallic. Technical grade . . . NOT A BY PRODUCT.

SULFUR

SULFURIC ACID

LIQUID SULFUR DIOXIDE
Highest commercial quality, available in tank cars, tank wagons, ton cylinders and 150-lb. cylinders.

CHLOROSULFONIC ACID
Iron less than 1.0 ppm as loaded. Water white. Delivered in glass-lined tank wagons, also in stainless steel drums.

SODIUM HYDROSULFITE
T-C HYDRO is a dry, white, free flowing, crystalline powder of uniform particle size and structure. It is dust free, assuring highest stability and uniformity.

PARA TOULENE SULFONIC ACID, ANHYDROUS
Other organic Sulfonic Acids.

IRON

FERRIC IRON SULFATE
Partially hydrated, free flowing granular form. Available in bags or bulk.

ZINC

MONOHYDRATED ZINC SULFATE
36% Zinc as metallic. White, free flowing powder.

ZINC OXIDE
Secondary Zinc Oxide.

MANGANESE

MANGANESE SULFATE
65% Mn SO_4. Designed specifically for inclusion in mixed fertilizer.

MONOHYDRATED MANGANESE SULFATE
93% Mn SO_4, H_2O. Highest purity, technical grade . . . NOT A BY-PRODUCT.

MANGANOUS OXIDE
Minimum 48% Manganese as metallic. Feeds, fertilizers, spray or dust grades.

Samples, specifications and detailed information available upon request.

TENNESSEE CORPORATION

617-29 Grant Building, Atlanta, Georgia

When inquiring check 4648 opposite last page

Associated Architects: Harrison & Abramovitz and John B. Peterkin. *General Contractor:* Turner Construction Co. *Building Owners:* Galbreath Corporation—John W. Galbreath and Peter B. Ruffin.

It took four to make the job of decorating the offices of Air Reduction Company, Incorporated—in the immense new Socony Mobil Building in mid-Manhattan—uniquely successful.

One—J. I. Hass, painter contractor, says of the paint—formulated with Colton Flexbond 800—used on Airco's office walls, "Our men found that with Flexbond 800, paint is easy to apply, quick to dry and odorless. Spots and smudges wash off easily."

Two—The paint was made by Socony Paint Products.

Three—Tinting colorants used for the *thirty* different wall colors were furnished by The California Ink Company, Inc., San Francisco, whose famous semi-annual Colortrend Reports, showing actual swatches of today's best-selling colors, are available to paint manufacturers.

Four—Flexbond 800 copolymer acetate emulsion (the vehicle), a product of Colton Chemical Company, added easy brushing, quick drying, odor elimination, sheen uniformity and film integrity to the paint.

Colton representatives have important information for you about Flexbond 800. Write Dept. A4.

COLTON **COLTON CHEMICAL COMPANY**

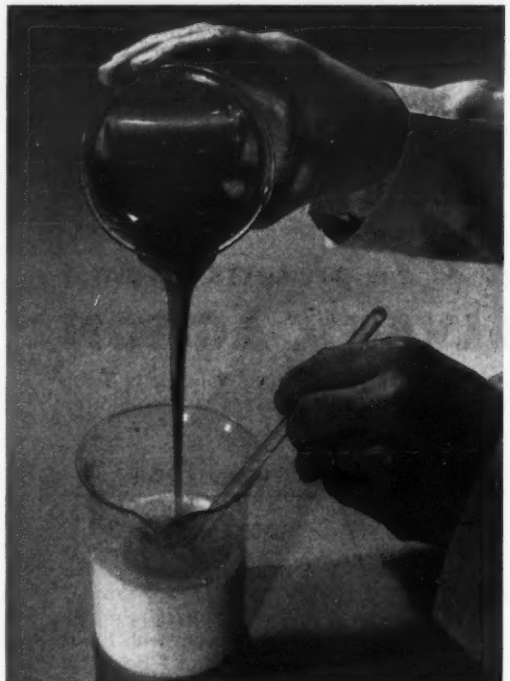
A Division of Air Reduction Company, Inc. • **1747 Chester Avenue** • **Cleveland 14, Ohio**

Sales Offices and Warehouse Facilities Throughout U. S. • Export: Airco Company International, New York 17, N. Y.

When inquiring check 4649 opposite last page

The present trend toward water-based coatings which can be brushed or sprayed on metal, masonry, and other surfaces is further advanced by development of —

a water-thinned polyamide-epoxy solvent-based coating system



Emulsion forms quickly, is easy to apply, and has good properties

Non-flammability, easy application, and protection that is equivalent to the corresponding solvent-based system — these are the advantages of protective coatings made from water-thinned polyamide-epoxy coatings.

Biggest boon for the water-thinned systems is that surfaces do not have to be dry before coating, either by brushing, spraying, or dipping. (For example, coating can be applied to sweating pipes.) Then too, surfaces only require a vigorous brushing to remove loose rust — they do not have to be sand-blasted.

Coating system is non-toxic, has a two to four day pot life (depending on solids concentration), and won't rust ferrous metals. The adhesion and impact resistance of the coatings are very good.

To use this coating, the painter mixes its two parts right on-the-spot. He blends an equal amount of the 60%-solids solution of polyamide resin with the 60% solids solution of epoxy resin. He then stirs the mixture into about an equal volume of water. A milky emulsion forms, and

typical formula for two-part water-thinned coating system

White Base	Lb	Gal
Epoxy resin (Epon 1001, or equivalent)	600	60.0
Xylol	200	41.5
MIBK	200	45.0
TiO_2 (Titanox RA50)	850	24.3
Versamid 100 Emulsion Base	1000	129.6
For use, stir the above two parts into:		
Water	2000	240.9

To color, pigment either part prior to blending and thinning with water. Do not use water-sensitive pigments or those containing an added surface-active agent.

Coating Constants

Nonvolatile on vehicle (%)	30
Solvent in vehicle (%)	20
Water in vehicle (%)	50
Nonvolatile in total mix (%)	42.3

he's in business.

At 75°F, it takes one day for a film to dry to touch and four to seven days to cure completely. At 300°F, however, it only takes ten minutes following a fifteen minute "set" period after coating.

Coating formulators can obtain the polyamide portion directly from the supplier. Two types are available: regular- and slow-evaporating systems. The slow-evaporating system dries to a higher gloss. These are handled as shown in the table.

(Versamid 100 emulsion base is a research development of General Mills, Inc., Dept. CP, 2010 E. Hennepin Ave., Minneapolis 13, Minnesota . . . or for more information check 4650 opposite last page.)

Zirconium, hafnium data

Booklet of 12 pages describes uses, and mechanical and physical properties of zirconium and hafnium. Manufacturer's sodium process for producing the metals, zirconium alloy systems, and fabrication of zirconium parts are included. Zr and Hf booklet — U. S. Industrial Chemicals Co., Div. of National Distillers Products Corp., Dept. CP, 99 Park Avenue, New York 16, N.Y. Check 4651.

thumbnail portrait

of the first filteraid to give really satisfactory performance in strong alkaline solutions

GLC Nerofil

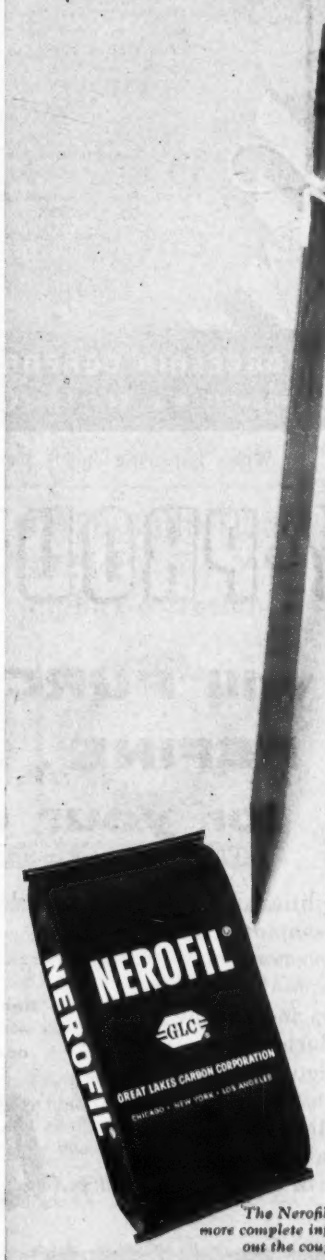
A processed carbon-base filteraid . . . the first complete-new type of filteraid developed in the past 20 years.

Characteristics—Physically and chemically stable. Practically unaffected even by boiling caustic. 30 minute test in 50% sodium hydroxide at 125°F. showed no silicon solubility.

Performance—Clarity of filtrate excellent. Flowrates comparable to those obtained with many grades of diatomite filteraids, due to low density and high porosity of the Nerofil filter cake.

Special Advantages—Filter cake is combustible, an advantage in metals values recovery. Nerofil does not have the high temperature breakdown of cellulosic filteraids, nor the silicon solubility of diatomite.

History of Use—After pilot tests, Nerofil has been adopted by, and is being used by, firms engaged in caustic production, sulfur production, textile mercerizing, metal plating, metallurgical work, the filtration of lignosulfonate liquors and other 'difficult' solutions.



The Nerofil Bulletin provides more complete information. Just fill out the coupon for your copy.

NEROFIL DEPARTMENT,
Great Lakes Carbon Corporation
612 So. Flower St., Los Angeles 17, Calif.

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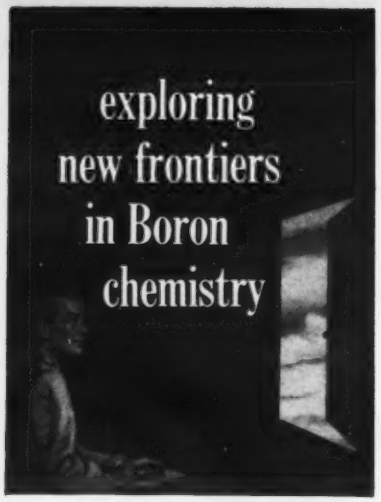
When inquiring check 4652 opposite last page



Latest addition to Trona's* growing list of boron intermediates... **boron halides...**

do they have a place in your product's future?

Boron Trichloride

Boron Tribromide

You might benefit from TRONA'S own basic research in these highly reactive compounds, BBr_3 and BCl_3, versatile as raw materials in the production of *elemental boron* and boron hydrides, as well as a variety of other uses.

Both compounds have been suggested as polymerization catalysts. BCl_3 has been proposed as a Friedel-Crafts condensing agent for organic synthesis, as a catalyst in inorganic reactions, and is particularly effective for the control of magnesium metal fires. It has been patented for stabilization of sulfur trioxide.

If you're concerned with the use of boron intermediates, write us today. TRONA's leadership in boron technology is your assurance of purity and uniformity to meet the most critical requirements.

*TRADEMARK, AP & CO

MARKET DEVELOPMENT DEPARTMENT

TRONA

American Potash & Chemical Corporation

3030 West Sixth Street, Los Angeles 54, California | 99 Park Avenue, New York 16, New York

When inquiring check 4653 opposite last page

Gives epoxy products with higher heat distortion points

Uses: To improve the high-temp performance of epoxy resins.

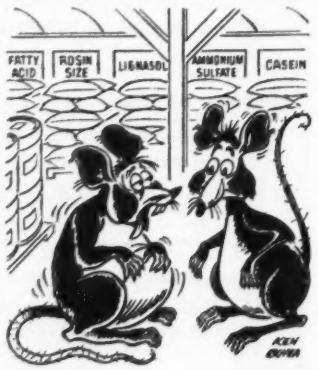
Features: Epoxies, when cured with this compound, have higher heat distortion points, higher elevated temperature flex strengths, and improved electrical characteristics.

Description: DDS, chemically 4,4′-diaminodiphenylsulfone, is presently available in developmental amounts.

(DDS is a product of Chemical Div., Merck & Co., Inc., Dept. CP, Rahway, N.J. . . . or for more information check 4654 on form opposite last page.)

Catalysts for ethylene

Laboratory experiments for preparation and use of polymerization catalysts for ethylene from sodium hydride are described in four-page bulletin. Tech bul 510 — Metal Hydrides Inc. Dept. CP, Beverly, Mass. Check 4655.



"I'm telling you, I've had more darn stomach trouble since I hit this place!"

Thanks to Ken Boyea, Hercules Powder Company, Holyoke, Mass.

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Over 35 years of Experience has taught many the real economy of KNOX TOWER PACKINGS for initial installations as well as replacements. For your added protection and satisfaction, sales are made direct, to you, the ultimate consumer.
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will PURCHASE or REFINE . . . for your account.

The facilities and experience of Truland may be employed advantageously for the economical upgrading and disposal of solvent mixtures and organic by-products.
Our technically trained personnel are available to discuss the refining of any solvent mixture or organic by-products.

Division of The Trubek Laboratories Incorporated

When inquiring check 4657 opposite last page

LAB REPORT

Odor and Color Development in ALKYL ARYLS

Problem:

Prevent odor and color reversion during aging of dried alkyl aryls.

Solution:

Protection against odor and color degradation is achieved by the addition of Compound 19 in percentages as low as 0.03%; add Compound 19 to neutralized slurry.

Note: The compound is compatible with additives such as perfumes and sequestering agents.

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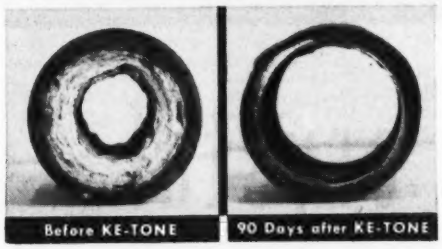
When inquiring check 4658 opposite last page

NEW PATENTED, WATER-CONDITIONER KE-TONE®*

removes scale, inhibits corrosion



KE-TONE — "Makes Water Work"

KE-TONE is a new and unconventional method for solving water-caused scale and corrosion problems. Developed from recent research in chelate and surface chemistry, it works by surface adsorption to fracture, suspend and dissolve scale. Only a few parts per million are needed to activate large volumes of water.

KE-TONE is highly efficient, extremely economical and performance-proved in the treatment of large or small volumes of water used in cooling towers, evaporators, boilers, heat exchangers and other industrial or commercial systems.

Outline your scale problem and send for Technical Bulletin on KE-TONE today. Ask for quote on 5 or 10 gal. Trial Drum.

*Composition and Methods Patented

UNITED CHEMICAL CORPORATION
OF NEW MEXICO, HOBBS, NEW MEXICO

When inquiring check 4659 opposite last page

Anti-stripping agent for paving roads in wet weather

Ups asphalt's bonding power in presence of water

Uses: Additive makes road paving possible irrespective of weather.

Features: Added 0.3-0.5% (wt), agent produces weather-resistant film of asphalt on either wet or dry hydrophilic aggregate, insures a more uniform coat, and permits wider selection of aggregates.

Description: Additives are salts of polyamines derived from tallow. Three products are available depending on application conditions.

(Redicotes are products of Chemical Div., Armour & Co., Dept. CP, 1355 W. 31st St., Chicago 9, Ill. . . . or for more information check 4660 on form opposite last page.)

Permanent softener for cotton goods won't yellow

Uses: Permanent softener, lubricant for cottons.

Features: Will not produce yellowing when product is reacted with thermosetting resins or when treated goods are stored. It is highly compatible.

Description: Nonionic emulsion of polyethylene increases tear and abrasion strength, imparts excellent hand.

(Ampitol PE-30 is a product of Dexter Chemical Corp., Dept. CP, New York 59, N.Y. . . . or for more information check 4661 opp. last page.)

About silicone rubbers

Complete look at silicone rubber is presented in 48-page booklet, containing 38 graphs and charts, basic chemistry, properties, and considerations and compromises involved in compounding silicone rubber. To obtain "1957 . . . Silicone Rubber" remit $1.00 direct to The Connecticut Hard Rubber Co., Dept. CP, 407 East St., New Haven 9, Conn.

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When inquiring check 4662 opposite last page

there's a future in this crystal

TRIMETHYLOLPROPANE BECOMES A COMMERCIAL CHEMICAL THROUGH CELANESE ALDOL PRODUCTION

The properties of this free-flowing flaked polyol have always intrigued the chemist. Its ability to improve the quality of paints, protective coatings, and particularly the exciting new polyurethane foams, promised Trimethylolpropane a big role in these and other applications. But, until Celanese developed a method for high volume, low cost production, the usefulness of Trimethylolpropane was severely limited.

New aldol processing units at the Celanese Chemcel Plant in Bishop, Texas, are now turning out commercial quantities of Trimethylolpropane—making available to manufacturers a product possessing low water content, low melting characteristics, and exceptionally high purity.

The development of Trimethylolpropane into a commercially practical chemical is an example of how Celanese research and product development teams are finding new ways to give industry what it needs in more productive basic and intermediate materials.

Celanese Corporation of America, Chemical Division, Dept. 591-G, 180 Madison Avenue, New York 16, N. Y. Celanese®

Basic reasons .....

Acids	Functional Fluids	Polyols
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Celanese CHEMICALS

..... for improved products

Agricultural, automotive, aviation, building, electrical, paper, pharmaceutical, plastics, surface coatings, textiles.

For more information on product at left, specify 4663 see information request blank opposite last page.

ADVERTISEMENT—*This entire page is a paid advertisement* *Prepared by U. S. Industrial Chemicals Co.*

U.S.I. CHEMICAL NEWS

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

Variety of Plastics Helps New Pump Lick Corrosion

Except for its drive motor, a new pump designed for electroplating and chemical service is made entirely of plastics. Six distinct kinds of plastic materials are used in its various components.

The pump body is made of polyethylene, the impeller of Hypalon. The filter and filter chamber utilize polyvinyl chloride, Dynel and a phenolic, while the hose is of vinyl. The pump handles from 50 to 300 gallons per hour, and, the manufacturer says, filters out all particles larger than about 1 micron. The plastics are said to take in stride such materials as chromic, fluoboric and nitric acids, and the filter successfully handles solutions of ferric chloride, silver nitrate, iron and lead fluoborate and many others.

Test Detects Trace Ethanol

A simple procedure for detecting trace amounts of ethanol in liquids has been developed and reported in the literature. It is especially sensitive when used with liquids that are free from water.

The test first oxidizes ethanol to acetaldehyde and then permits detection of the latter by reaction with nitroprusside. As little as 3 micrograms of ethanol in one drop of a benzenethanol mixture can be easily detected. Presence of water in the test liquid results in hydration of some of the acetaldehyde and thereby decreases the sensitivity of the test.

One to three drops of the sample are placed in a micro test tube, and several centigrams of hot copper wire or cupric oxide are dropped into the tube. A disc of filter paper moistened with one drop of a freshly made reagent (consisting of equal volumes of 5% sodium nitroprusside solution and 20% aqueous morpholine solution) is placed over the top of the test tube. If ethanol is present, a deep to light blue stain appears on the paper almost at once.

Tank for Nuclear Reactor Fabricated Entirely of Zirconium Alloy

A new experimental nuclear power reactor utilizes a tank fabricated entirely of Zircaloy-2. The complex assembly illustrates how conventional fabricating techniques can be modified to permit the use of zirconium and its alloys.

Because zirconium is highly reactive at high temperatures, welds of the metal and its alloys must be shielded against air. This shielding was achieved with a water-cooled apparatus specially designed to fit the spherical and conical shapes of the welded surfaces. The apparatus also directed inert gas at and behind the torch.

Nat'l Distillers Changes Name To Reflect Growth of Activities In U. S. I. Chemical Division

Now National Distillers and Chemical Corporation; U.S.I. Head Made an Executive V.P.; Third of 1956 Profits from Chemicals

National Distillers Products Corporation has changed its name to National Distillers and Chemical Corporation.

The new corporate title reflects the substantial growth of the company's chemical operations, which last year contributed 34% of operating profits before interest, taxes and minority interest.

ATTENTION: Users of Taxfree And Specially Denatured Alcohol

Users of specially denatured and taxfree alcohols who are in the process of filling out forms for renewal of their basic and withdrawal permits should note that U.S.I.'s parent company has changed its name (see story, next column).

When you file your applications with the Assistant Regional Commissioner—Alcohol and Tobacco Tax Division. please be sure to use the new company name, U.S. Industrial Chemicals Co., Division of National Distillers and Chemical Corporation.

National entered the chemical field in 1950 when it built a sodium plant at Ashtabula, Ohio. This operation is now a part of the U. S. Industrial Chemicals Co. division, acquired by the parent company in 1951. Today, all chemical activities of the corporation are conducted through its U.S.I. division and its subsidiary, National Petro-Chemicals Corporation.

Elect New Officers

Coincident with the name change, John E. Bierwirth, president of the corporation, announced the promotion of a number of key executives. Among these were Dr. R. E. Hulse, Roy F. Coppedge and B. C. Ohlandt. who were elected executive vice presidents. Dr. Hulse is executive vice president in charge of the U.S.I. division, with responsibility for all

MORE

New Officers at National Distillers — U.S.I.

Dr. R. E. Hulse, new Executive V. P. of National Distillers and General Manager and V.P. of U.S.I. Division, directs Corporation's chemical operations. He joined National in 1949 as Director of Research and Development. William P. Marsh Jr., Assistant General Manager of U.S.I. Division and V.P. of National Distillers, has been named U.S.I. V.P. as well. Dr. Stuart Schott, with National since 1945, is new Research V.P. of U.S.I. Francis Olmsted heads the Development Department as a U.S.I. V.P. Alden R. Ludlow, Jr. joined company in 1934, has now been made U.S.I. Sales V.P. R. H. Cornwell was appointed U.S.I. V.P. of production, and is in charge of all U.S.I. and National Petro-Chemicals plants.

R. E. Hulse

W. P. Marsh, Jr.

S. Schott

F. Olmsted

A. R. Ludlow, Jr.

R. H. Cornwell

★ U.S.I. CHEMICAL NEWS ★

U.S.I. "Chemical News" Marks 25th Anniversary

Has Largest Circulation of Any Publication in Chemical Industry

With this issue, U.S.I. "Chemical News" rounds out 25 years of service to the chemical processing industry. Today, "Chemical News" is the most widely circulated medium of its kind in its field. It is regularly inserted in all leading U.S. chemical periodicals, and in addition has substantial distribution by mail. Combined circulation is over 320,000.

Attracts Many Inquiries

The high degree of interest in "Chemical News" is reflected both in inquiries and in readership ratings, and last year it brought thousands of inquiries about the products and services mentioned in its columns. And it consistently gets the highest advertising readership ratings in publications where it appears.

One reason for this sustained interest is that "Chemical News" does not confine its columns to information about products of U.S.I. Considerable space is devoted to items about products of other manufacturers, to research findings and to processing technology. In short, "news value" is the editorial criterion.

The Technical Developments column, a regular feature of page 2, describes new products and processes that range across the entire industry. Manufacturers who have something new to tell their prospects can take advantage of this column by writing the Editor.

SOLVENT NEWS

ALCOHOL PRICES RELEASED TO THE INDUSTRY FOR THIRD QUARTER

NO CHANGE FROM PRESENT LEVELS

ETHYL ACETO ACETATE DEMONSTRATES VERSATILITY

DU PONT OFFERS NEW WATERPROOF MATERIAL

NEW LACQUER LINSEED OIL ANNOUNCED

The first U.S.I. "blue sheet"—June, 1932. The name was later changed to "U.S.I. Chemical News" to reflect the expanding activities of the company.

Would You Like to Get "Chemical News" by Mail?

If you would like to make sure you see every issue of "Chemical News" or, if you keep a permanent file of them, as many readers do, ask to be put on the mailing list. Just write Editor, U.S.I. Chemical News, U.S. Industrial Chemicals Co., 99 Park Ave., N. Y. 16, N. Y.

New Polyethylene Squeeze Tube Keeps Original Shape

A new kind of squeeze tube has been developed. Made of polyethylene, it looks just like the familiar collapsible metal tube, but snaps back to its original shape after being squeezed to dispense part of its contents. In so doing, internal pressure is lowered and excess material at the mouth of the tube is sucked back inside. Advantages include less waste and no hardening or drying out of the tube contents.

CONTINUED

Name Change

chemical activities of the corporation.

Both Dr. Hulse and Mr. William P. Marsh Jr., U.S.I. Assistant General Manager and a Vice President of National Distillers, have been named Vice Presidents of the U.S.I. Division.

Four other executives were appointed U.S.I. vice presidents. They are: Robert H. Cornwell, who is in charge of production; Alden R. Ludlow, Jr., sales; Francis Olmsted, development; and Dr. Stuart Schott, research.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U. S. I.

A non-corrosive leak detection paint is reputed to be effective in quickly spotting fissures to 0.001 in. dia. in assemblies, systems, tanks, etc. Ammonia works a color change at fissure. Paint is easily washed or wiped off. **No. 1240**

A tributyltin oxide to control microbiological slime in pulp and paper mill systems is reported highly successful under all pH conditions. Also non-corrosive, low in toxicity, and very economical. **No. 1241**

A spray-on sign cleaning "solute" is offered as compatible with water of 0-50 grain hardness, fast-acting, simple to rinse off, and harmless to steel, paint, and personnel. Cost claimed 1¢ per sq. ft. cleaned. **No. 1242**

Another radioactive carbon-14 compound joins available uniformly and specifically labelled radioactive amino acids. Uses are expected in the study of biological systems and amino acid formation and metabolism. **No. 1243**

Updated activated carbon solvent recovery systems are said to recover numerous solvents at a very economical cost. They also appear to increase both process efficiency and employee productivity. **No. 1244**

Detergent concentration is constantly controlled over a narrow range by a unique controller using neither vacuum tubes nor transistor circuitry. Equipment is reported priced for a wide market, with installation low in cost. **No. 1245**

A self-contained temperature stabilizer, quart size and factory sealed, has been designed to maintain a specified temperature within insulated shipping packages of up to 800 cu. in. It is reusable on recharge by purchaser. **No. 1246**

A 24-page brochure on lanolin reviews industrial origins of this wax, its composition, properties, U.S.P. grades, its cosmetic and pharmaceutical uses as emollient and emulsifier. Guide formulations are included. **No. 1247**

A selective flocculant for ore refiners is said to precipitate dissimilar particles suspended in aqueous mixtures when only 0.002% based on weight is added to the ore suspension as a cold water slurry. **No. 1248**

A new book on public relations for the atomic industry is being marketed. It discusses the atom as news, what the public wants to know about it, sources of information and techniques for approaching the public. **No. 1249**

PRODUCTS OF U.S.I.

METALS

Titanium Sponge
Zirconium Sponge and Platelets
Hafnium Sponge and Oxide

OTHER PRODUCTS

Inorganic Chemicals: Sodium, Chlorine, Caustic Soda, Sodium Peroxide, Sodium Sulfate, Sulfuric Acid, Phosphatic Fertilizer Solution (Wet Process Phosphoric Acid) Ammonia, Nitrogen Fertilizer Solutions, Ammonium Nitrate.

Alcohols: Ethyl (pure and all denatured formulas), Normal Butyl Amyl, Fusel Oil; Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL® M, ANSOL® PR.

PETROTHENE® Polyethylene Resins

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Intermediates and Fine Chemicals: Acetoacetarylides, Dimethyl Hydrazine, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Chloride, Ethyl Sodium Oxalacetate, U.S.I. ISOSEBACIC® Acid, Methyl Hydrazine, Sodium Ethylate Solution, Triethyl Aluminum, Trimethyl Aluminum, Urethan USP (Ethyl Carbamate).

Animal Feed Products: Calcium Pantothenate, Choline Chloride Products, Curbay B-G® 80, Special Liquid Curbay®, DL-Methionine, Niacin USP, Riboflavin Concentrates, Vitamin B_{12} and Antibiotic Feed Supplements, Vacatone® 40, Vitamin D_3 and K_3 Products, Antioxidant (BHT) Products, U.S.I. Permadry Products (Sealed-in Vitamin A), Special Mixes.

Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Riboflavin USP, Urethan USP, Intermediates.

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Silicone resin retains gloss at high temp

Cured films don't yellow, have good adhesion

Uses: For making high- temp protective, decorative coatings.

Features: Resin provides much greater gloss retention after long exposure to high temp than previously possible. Cured films are non-yellowing, have excellent adhesion and flexibility, resist moisture and many common chemicals.

Description: Silicone resin was designed for making white and light-colored finishes.

(No. 808 Resin is a product of Dow Corning Corp., Dept. CP, Midland, Mich. . . . or for more information check 466 on form opposite last page.

Compound has properties similar to rubber accelerators

Uses: For cross-linking through disulfide bonds for rubber stabilization, textile processing, other applications.

Features: Reaction of compound with amino groups of amino acids, peptides, or proteins at low temp under mildly alkaline conditions forms new peptide bonds, simultaneously forms a free sulfhydryl group.

Description: N-Acetyl DL homocysteine thiolactone has chemical properties similar to those of vulcanization accelerators.

(N-Acetyl DL-homocysteine thiolactone is product of Schwarz Laboratories, Inc. Dept. CP, 230 Washington St. Mount Vernon, N.Y. . . . for more information check 4665 on form located opposite last page.)

For more information on product at left, specify 4666 . . . see information request blank opposite last page.

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For making high-
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previously possible.
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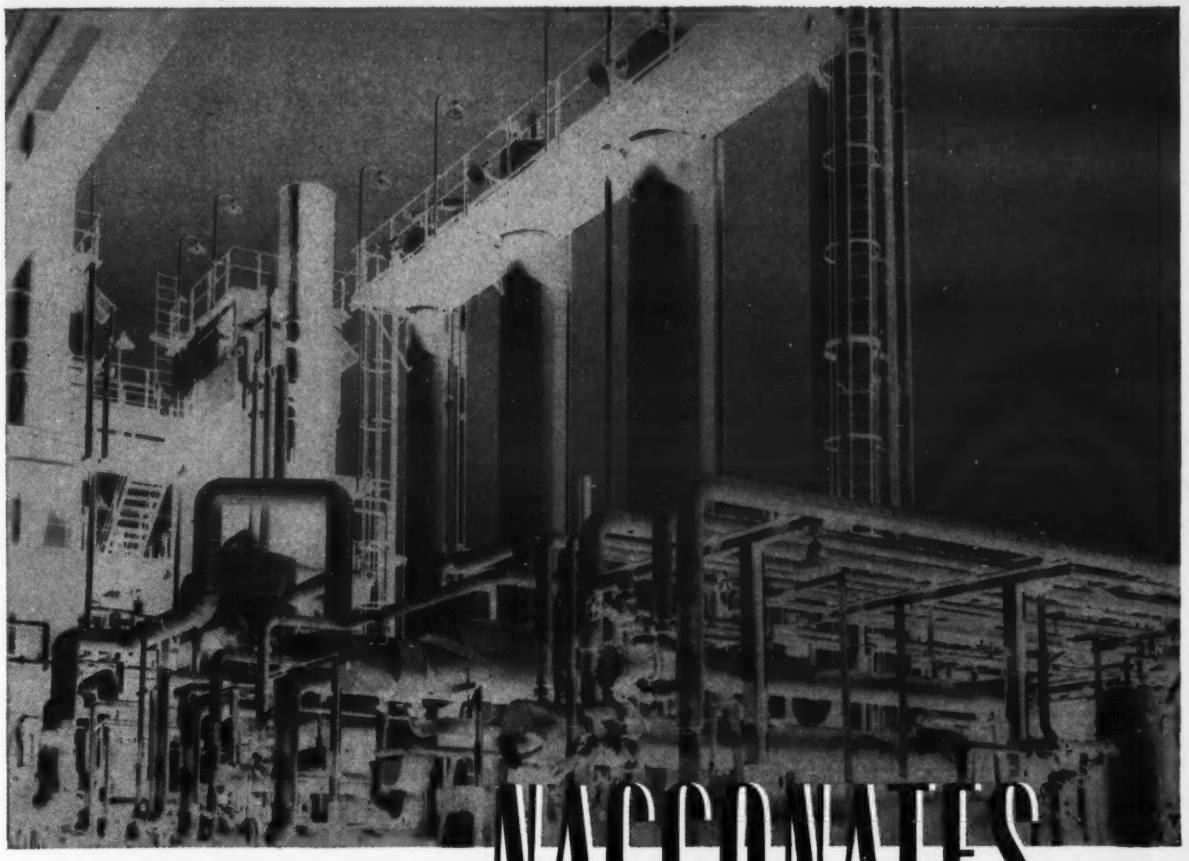

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(DIISOCYANATES)

for your present and potential urethane production

Our multimillion-dollar plant at Moundsville, W. Va. is now producing NACCONATES in substantial commercial quantities for urethane makers. We are prepared to supply whatever quantity you need for development or full-scale production.

If you are doing research in the urethane field, we will be glad to share with you the product and application data developed in our Buffalo Research Laboratories. The coupon at the right is for your convenience.

NATIONAL ANILINE DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.

Akron Atlanta Boston Charlotte Chattanooga Chicago Columbus, Ga. Greensboro Los Angeles New Orleans Philadelphia Portland, Ore. Providence Richmond San Francisco Toronto

Please mail me literature checked below:

- ☐ Technical Bulletins I-17A to F on NACCONATES
- ☐ Application Data Sheet 41156—Flexible Foams
- ☐ Application Data Sheet 7956—Semi-rigid Foams
- ☐ Application Data Sheet 112356—Protective Coatings
- ☐ Interested in Literature only.
- ☐ Have representative call by appointment.

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

D-14

When inquiring check 4667 opposite last page

V2017 JUL 57 XUM

"NOSEY" says:

POLECATS make nice pets — providin' they're **de**-scented! Same goes for lots of commercial products like plastic bath curtains, rubber goods, paints 'n such. Take away the **bad** smell, or add a **good** one, then you've got the sort of product folks really like to have around the house. Costs so little, too, and man, how it helps a product's sales. Seems just good common sense to check 'n see what odor experts like FRITZSCHE, for instance, can do to give your product a better scent. Why not write 'n find out?

FRITZSCHE Brothers, Inc.

Est. 1871

PORT AUTHORITY BUILDING, 76 NINTH AVENUE, NEW YORK 11, N. Y.

BRANCH OFFICES and *STOCKS: Atlanta, Ga., Boston, Mass., *Chicago, Ill., Cincinnati, O., *Los Angeles, Calif., Philadelphia, Pa., San Francisco, Calif., St. Louis, Mo., Montreal and *Toronto, Canada and *Mexico, D. F FACTORY: Clifton, N. J.

When inquiring check 4668 opposite last page

The Smart Trend in

PVA EXTENDERS

Tamms GOLD BOND SILICA

A functional extender pigment especially adapted to PVA formulation for scrubability, leveling and flat sheen. It is easily wetted and dispersable. pH of 6.5–6.8. Non-crystalline structure. Economical in cost.

TAMMS INDUSTRIES, INC.

When inquiring check 4669 opposite last page

MATERIALS

Solvent-dispersible wax has minimum settling, excellent glossability

Dispersions remain liquid even at freezing temp

Uses: In liquid polishes, dry-cleaning solvents, release agents for cement molds, plastic polishing agents, wax impregnations for wood.

Features: Dispersions in mineral spirits show minimum settling, remain liquid even at freezing temperatures. Wax has excellent glossability, perfect suspension in cold solvent, protects against moisture and fume attack.

Description: Fischer-Tropsch wax is non-polar, solidifies above 200°F, is snow white, and melts are water-clear. Acid and saponification values are zero.

(FT-Wax MC is a product of Dura Commodities Corp., Dept. CP, 20 Vesey St., New York 7, N.Y. . . . or for more information check 4670 on form opposite last page.)

Menthane diamine is epoxy resin curing agent

Also raw material for polyurethane manufacture

Uses: As an epoxy resin curing agent and a raw material for polyurethane manufacture after conversion to the diisocyanate.

Features: Compound reacts with dibasic acids or anhydrides to form polyamides. Use in various organic syntheses, such as preparation of dyes, inhibitors, rubber accelerators, and medicinals should be considered.

Description: Menthane diamine is available in developmental quantities at $2.00 a pound.

(Menthane diamine is a product of Rohm & Haas Co., Dept. CP, Washington Square, Philadelphia 5, Pa. . . . or for more information check 4671 on the convenient Reader Service slip opp. last page.)

alphabetical index on page 244

. . . for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 244. "Quick-locator" starting on that page was a feature in CHEMICAL PROCESSING years ago. It means extra work for the Editors, but it helps you, the reader, in finding what you want . . . in a hurry!

starches
dextrines
soluble and etherized starches
water soluble gums
polyvinyl acetate emulsions

your COMPLETE source for

•THICKENING AGENTS

- sizings
- emulsifiers
- binders
- flotation agents
- adhesives

Our years of experience in supplying these products to textile mills, paper mills, chemical processing industries, etc., can be useful to your particular problem. Tell us your needs — our complete line is bound to contain the answer to your requirements.

Morningstar SCIENTIFIC STARCH SERVICE

MORNINGSTAR, NICOL, INC.
630 West 51st Street, New York 19, N. Y.
leadership through products-leadership through service

When inquiring check 4673 opposite last page

Add to series of dyes for polyester fibers

Two dyes added to manufacturer's series of dyes for polyester fibers bring total number to 12.

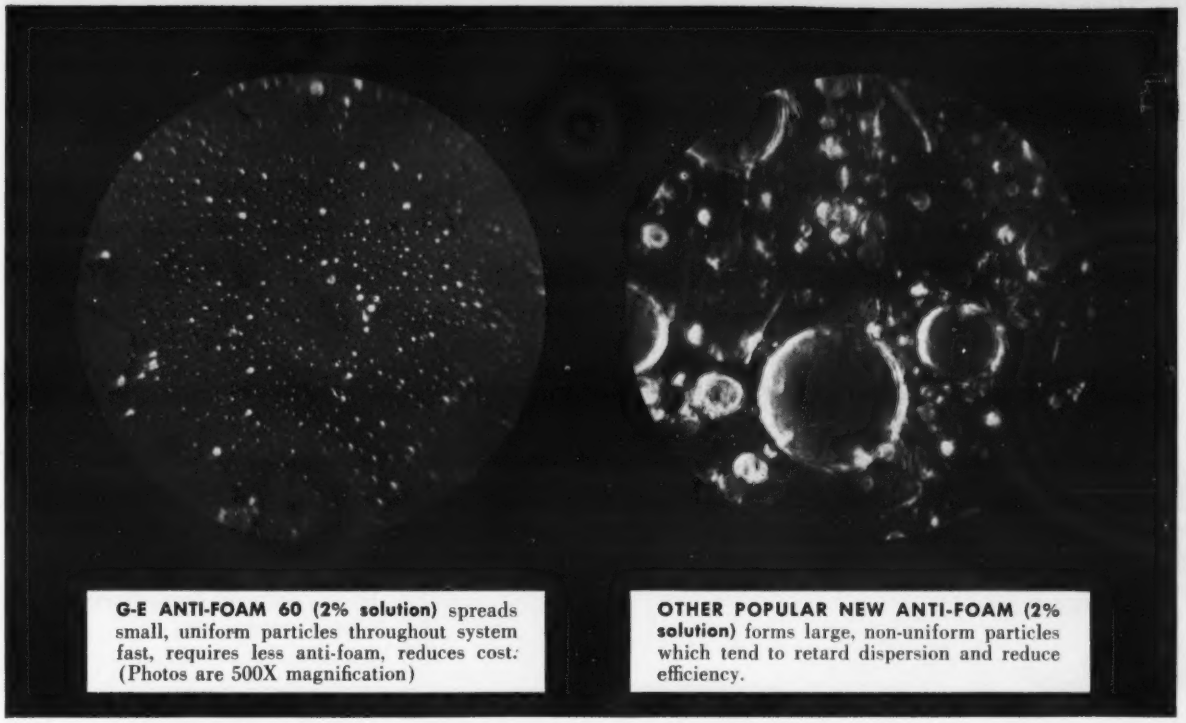
Polyester Yellow RL produces economical, level shades of bright golden yellow on polyester fibers with good fastness to light, washing, and sublimation. Dye may be applied at boil with carrier or under pressure. Good union dyeings may be obtained.

Polyester Dark Red FL, a maroon dye, is suitable for dark wine, bordeaux, brown, and rubine shades on polyester fibers. In heavy shades it is fast to washing, dry cleaning, perspiration, sublimation, and light. It may be applied at boil with carriers or under pressure.

(Eastman Polyester Yellow RL and Dark Red FL are products of Eastman Chemical Products, Inc., subsidiary of Eastman Kodak Co., Dept. CP, 260 Madison Ave., New York 16, N.Y. . . . or for more information check 4674 on the convenient Reader Service slip opposite last page.)

"See what happens when I add the catalyst?"

Thanks to Harold Money, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware



G-E ANTI-FOAM 60 (2% solution) spreads small, uniform particles throughout system fast, requires less anti-foam, reduces cost. (Photos are 500X magnification)

OTHER POPULAR NEW ANTI-FOAM (2% solution) forms large, non-uniform particles which tend to retard dispersion and reduce efficiency.

Micro-photographs show why . . .

G-E silicone Anti-foam 60 disperses faster, controls foam more economically

Rapid dispersion of small, uniform particles of anti-foam material is the key to fast, low-cost foam control. Here the performance of General Electric silicone Anti-foam 60 is outstanding. Anti-foam 60 disperses almost instantly into minute, uniform particles that destroy foam bubbles *fast.*

And with G-E Anti-foam 60 you get maximum benefit from silicone's inherent foam-destroying action, and get it *more economically* because only a few parts per million are needed in most foaming systems.

If defoaming can reduce your processing and filling time, eliminate costly boil-overs or increase your batch capacity (in aqueous systems), get a free test sample of General Electric Anti-foam 60 by mailing the coupon below. We think you will find, as many others have, that Anti-foam 60 is the most economical answer to your problems.

For non-aqueous systems—

G-E silicone fluids and compounds are also available for efficient low-cost defoaming of non-aqueous systems. Ask for free samples of SS-66 or SF-96.

SS-66 is a low-viscosity silicone anti-foam compound. Typical uses include defoaming during esterification of vegetable oils—as well as in paints, inks, antibiotic fermentation and phenolic resin cooking.

SF-96 fluids are available in standard viscosities from 40 to 100,000 centistokes for defoaming all hydrocarbons from light-end gasolines to heavy-end asphalts.

Mail this coupon for a free test sample:

Progress Is Our Most Important Product

GENERAL ELECTRIC

Silicone Products Dept.
Waterford, New York

Dept. A2E7, Silicone Products Department
General Electric Company, Waterford, New York

Please send me a sample of G-E Anti-foam

☐ **AF-60** ☐ **SS-66** ☐ **SF-96**

Application_____

Name_____ **Position**_____

Company_____

Street_____

City_____ **Zone**____ **State**_____

When inquiring check 4675 opposite last page

BRIEFS for buyers of

Caustic Soda

Phosphorus Compounds

Other Chemicals

Chemicals for a growth area

Pulp, petroleum, and plywood are three of the main reasons why industry is popping in western Canada.

Fitting neatly into this growth picture is the new plant of Hooker Chemicals, Ltd., in North Vancouver, B.C. The plant, which opens this summer, is Canada's first chlor-alkali producing point west of the Rockies.

By rail and barge, it will supply caustic soda and chlorine for making and bleaching pulp; more caustic soda to help sweeten petroleum refinery products and to produce plywood adhesives.

Hooker customers around Vancouver will enjoy a freight saving on these chemicals, which formerly came into the area by sea-going barge from our Tacoma plant.

Is your supplier growing with you?

In its modest way, this new Hooker plant underscores a point that you may consider important in your own expansion plans.

You have much to gain by tying up with a chemical supplier geared to the spread of industry into new areas; accustomed to anticipating your requirements of tomorrow, even while serving you dependably today.

Close to the major industrial centers of the East, Midwest, and West Coast, Hooker plants and stock points give you quick, dependable service when you need it. All Hooker caustic soda plants and distributing points are on deep water. This makes transportation extremely flexible. It tends to minimize shipping costs, and permits a choice that can make a big difference if an emergency occurs.

And if you buy l/c/l, there's an authorized Hooker distributor nearby, ready to meet your needs for caustic soda and other Hooker chemicals.

If you'd like to see how this flexible, fast-moving supply team can strengthen your position on chemicals, drop us a line and we'll get the facts to you promptly.

New bulletin lists Hooker products

You'll find a complete up-to-the-minute listing of Hooker chemicals in this new 12-page bulletin.

The new bulletin supersedes General Products List 100 and Bulletin 100-A which you may have now. Indexed for ready reference, it lists the chemicals you can buy from us in commercial quantity, including chemicals sold under the NIALK® and OLDBURY® brand names.

Under each product you'll find a short description and condensed listing of properties, actual and suggested uses, and shipping containers. The bulletin also sums up for you the major types of processing performed at Hooker.

If you'd like to have this up-to-date timesaver in your file or on your desk, just check the coupon for a copy of *Bulletin 100-A.*

Here's data on phosphorus-sulfur compounds

Every time you strike a match, you're helping to justify the market researchers' predictions for one of our OLDBURY Products: red phosphorus.

This fascinating element got off to a commercial start in this country in 1910, on the site of the present OLDBURY Products plant in Niagara Falls.

Today many other items that must burn up before they can do anyone any good are made with OLDBURY *red phosphorus* or *phosphorus sesquisulfide,* P_4S_3. These include matches, fireworks, safety and signal flares, fusees, and smoke screens.

Your product may require another equally useful, though less dramatic, way of putting phosphorus to work: *Phosphorus Pentasulfide,* P_4S_{10}. We make it in three particle-size grades of powder, and as a fused solid. Phosphorus content is 27.8% minimum. Powder forms come in lever-pak drums, 150 lbs. net; solid in single-trip steel drums, 215 lbs. net.

These products are available, as always, under the highly reputed OLDBURY label. For more information, we suggest you check the coupon for new technical data sheets just completed.

For more information on chemicals mentioned on this page, check here:

- ☐ Caustic Soda
- ☐ New list of products—Bulletin 100-A
- ☐ Phosphorus, white
- ☐ Phosphorus, red
- ☐ Phosphorus Pentasulfide
- ☐ Phosphorus Sesquisulfide

Clip and mail to us with your name, title, company address. *(When requesting samples, please use business letterhead.)*

HOOKER ELECTROCHEMICAL COMPANY
507 FORTY-SEVENTH STREET, NIAGARA FALLS, N. Y.

NIAGARA FALLS • TACOMA • MONTAGUE, MICH. • NEW YORK • CHICAGO • LOS ANGELES

HOOKER CHEMICALS PLASTICS

When inquiring check 4676 opposite last page

MATERIALS

Liquid defoamer for aqueous systems

Uses: In latex paints, coating and resin sizing of papers, textile sizing, metal cleansers, adhesives, and low-sudsing detergents.

Features: Liquid defoamer gives excellent results in aqueous systems where foaming is a process problem or is undesirable in the end use.

When combined with a foaming surface-active, agent gives synergistic surface activity and reduces or eliminates foam.

Description: Ditertiary acetylenic glycol is a nonionic surface-active.

(Surfynol 104A is a product of Air Reduction Chemical Co., a div. of Air Reduction Co., Inc., Dept. CP, 150 E. 42nd St., New York 17, N.Y. . . . or for more information reader may simply check 4677 on convenient Reader Service slip opposite last page.)

Encapsulating resin is flexible and economical

Uses: In potting, casting.

Features: Resin is more economical to use than currently available flexible systems.

Description: Fexible epoxy system cures at 75°C.

(Hysol 6900 series is a product of Houghton Laboratories, Inc., Dept. CP, Olean, N.Y. . . . or for more information check 4678 on form opposite last page.)

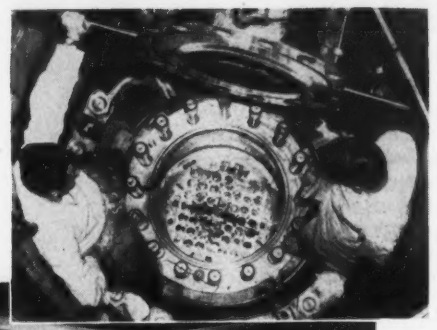
Textile coloring bibliography

Fourteen-page bibliography lists over 140 books and publications on natural and synthetic dyestuffs, dyeing, synthetic and natural fibers, textile printing, analysis and testing, and bibliographies. "Textile Coloring Bibliography" — Royce Chemical Co., Dept. CP, Carlton Hill, N.J.

Opening a new chapter in the military application of nuclear energy is the . . .

Army's package power reactor

Designed so that components can be shipped by air for assembly in remote, hard-to-get-to locations



Console control panel permits operator to check each component of reactor and power plant. Top photo shows core structure of APPR

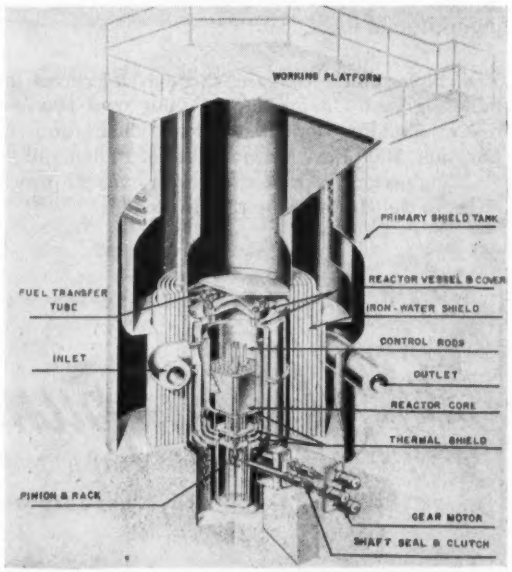
Latest reactor in the seemingly endless parade of nuclear reactors going into operation, is the APPR — the Army Package Power Reactor. Now critical and undergoing extensive tests, it is the Army's first nuclear power plant, and is the prototype of a family of power plants being developed by the AEC and the Department of Defense. As the name implies, the concept envisions that all the components will be transportable by air, ready to be erected at remote and relatively inaccessible locations. Assembly would take from 3 to 6 months. Overall cost is about $3.5 million — AEC sharing the cost with the Department of Defense.

The APPR is designed to operate at full power for a year and a half on about 15 pounds of U-235. Over the same period, a conventional plant of same capacity would consume some 60,000 barrels of fuel oil, equivalent to a medium-size tanker. Even under peace-time conditions, transportation savings are expected to counter-balance the greater capital cost of a nuclear plant, so that at a remote base the nuclear plant will pay for itself in a few years.

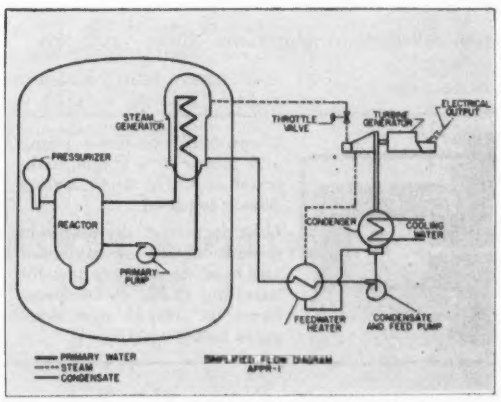
Uses pressurized-water concept

Located at Fort Belvoir, Va., the APPR is a 2035-kw pressurized-water nuclear electrical generating plant (the pressurized-water concept is the one used on the submarine Nautilus, which has successfully logged thousands of miles of operation). It is the first power reactor using stainless steel-clad fuel, with light water as the coolant and moderator.

In operation, pressurized water at 431°F and 1200 psi, circulates through the reactor at 4000 gpm, is heated to 450°F, and passes to a heat exchanger where it transfers its heat to water in a secondary loop (see drawing). Heat converts secondary water to steam which is used to drive the turbine. Steam is produced at rate of 34,070 lb/hr under pressure of 200 psi at 407°F. Plant has a net power output of 1855 kw — 180 kw being required for plant auxiliaries. Output is used to supplement the Ft. Belvoir power distribution system. It could provide power for a community of 2000.



Isometric view of reactor vessel, core, and control rod structure



Reactor description

Main components of the primary system are: 1) reactor vessel and core; 2) control rods and drives; 3) two coolant pumps; 4) piping; 5) steam generator; 6) pressurizer; 7) water purification equipment; and 8) shielding.

The reactor core consists of 38 fuel rods and 7 control-rod assemblies arranged in a grid structure of a basic 7x7 de-

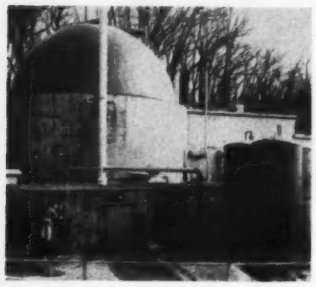
Turn to next page

Power Reactor

Starts on page 139

sign with the corners missing. Reactor's thermal flux averages about 2.7 x 10^{13} neutrons/(cm²)(sec). Core and its supporting structure are housed in a stainless-steel-clad reactor vessel (see isometric) measuring 47½" ID x 162" overall length. It is clad with 0.125" stainless on all surfaces in contact with primary water.

Fully-enriched, uranium-dioxide fuel is incorporated into flat-plate type elements. Each fuel assembly consists of 18 fuel plates brazed into

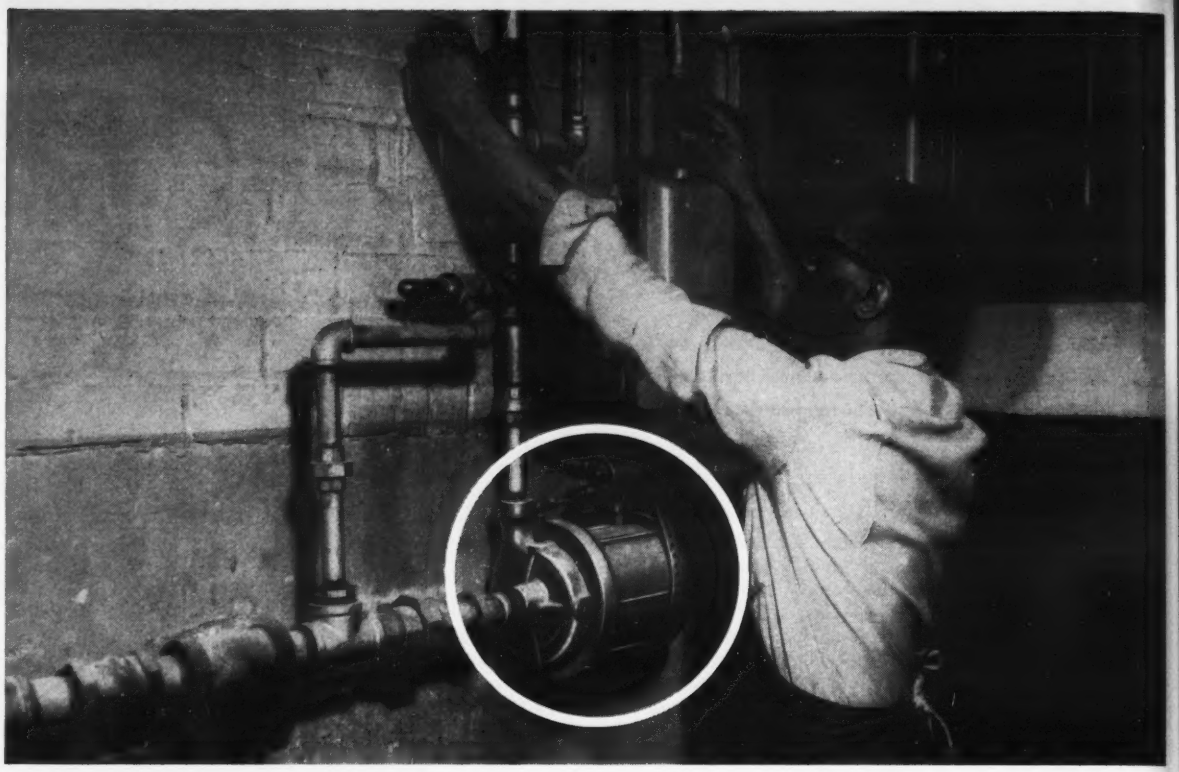


Plant has net output of 1855 kw, can operate at full power for 1½ yr on 15 lb fuel

a pair of 304L stainless steel side plates 27" long, 2.863" wide, and 0.050" thick. Outside plates are 27" long, and the internal plates are 23" long. Each assembly has on both ends a 304L stainless steel grid adapter.

Control rods consist of two sections — a fuel section, and an absorber section. Control-rod fuel plates are fabricated in same manner as the stationary plates, but are 23" long, 2.56" wide, and 0.03" thick. Absorber section is boron enriched in the isotope boron-10.

The 1200 psi operating level of the system is maintained by two immersion heaters housed in a stainless-clad pressurizer. Pressurizer has 45" ID and is mounted on a cylinder 16" ID by 54" long. Pressurizer contains enough steam and liquid to absorb fluctuations of primary liquid volume without excessive pressure changes. Water in the system is maintained at a to-



Chempump holds costs down

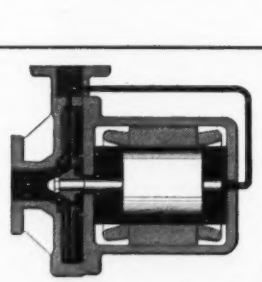
handling trichlorethylene at Argus Cameras

The explosion-proof *Chempump* shown above is one of two used at the Argus Cameras Division of Sylvania Electric Products, Inc., plant in Ann Arbor, Mich. to move trichlorethylene from storage to holding tanks.

Trichlorethylene—expensive and highly volatile—is used here at Argus for degreasing. It's hard to hold—seeps through conventional pump packing and dissolves packing lubricants. Leakage could mean continual maintenance expense, loss of costly trichlorethylene, and the hazard of explosion.

For Argus, *Chempump* eliminates these problems because it can't possibly leak—has no seals, no stuffing box, no packing. Simplicity of design reduces maintenance to an occasional inspection and replacement of bearings. External lubrication is never required . . . bearings are constantly lubricated by the pumped fluid itself.

You have much to gain through leakproof fluid handling with Chempump in your own processing operations. For details, write to Chempump Corporation, 1300 East Mermaid Lane, Philadelphia 18, Pa. Engineering representatives in over 30 principal cities in the United States and Canada.



Chempump combines pump and motor in a single, leakproof unit. No shaft sealing device required.

U.L. approved. Available in a wide choice of materials and head-capacity ranges for handling fluids at temperatures to 1000 F. and pressures to 5000 psi.

Chempump

First in the field...process proved

When inquiring check 4679 opposite last page

tal solid concentration of not more than 2 ppm by means of two demineralizers and a micro-metallic filter.

Shielding

Primary shield is 156″ diam steel tank filled with water and containing eight concentric steel cylinders (see isometric). Each cylinder is 2″ thick. Cylinders are separated by 1″ layer of water. Innermost cylinder also functions as inner wall of tank and as a support for the pressure vessel. The iron-water shield was selected because it weighs less, is smaller than an equivalent concrete shield, and permits faster fabrication on the site.

The secondary shield consists of 5′ of concrete. It is designed so that dose rate will be less than 1.5 mr/hr at any point outside the vapor container at building level.

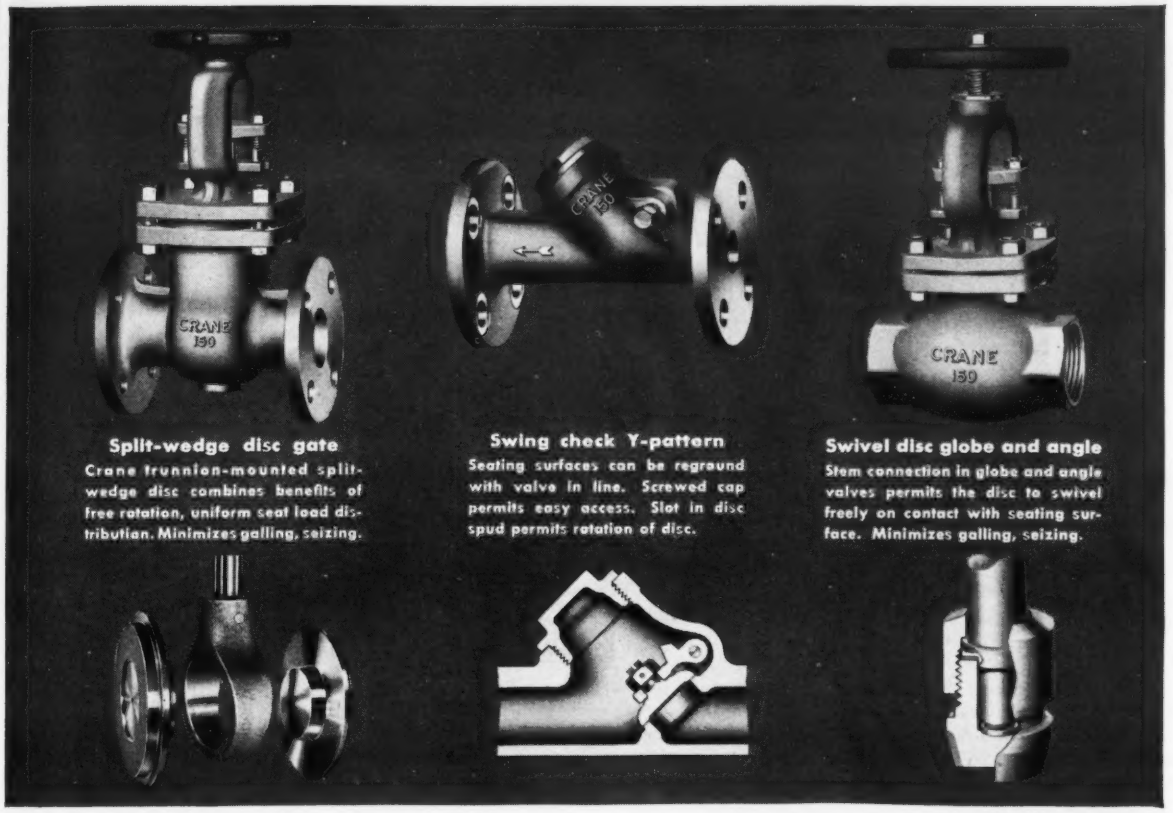
Modified Prototype

Because the prototype APPR is located in a populated area, it had to be somewhat modified to provide a greater measure of safety. Biggest change is in the overall containment, which consists of a dome-shaped vapor container 36′ diam and 64′ high. This is hermetically sealed, and all seams were radio-graphed. It was fabricated from ⅞″ thick steel ring segments, and has both spherical ends and cylindrical section lined with 2′ of reinforced concrete. An additional 3′ of concrete surrounds the container from ground level to height of control room roof. Inner surface of 2′ concrete shield is lined with a light steel plate shell which prevents contamination of the concrete liner and facilitates cleaning.

The APPR will also be used for training purposes. Operating personnel are being obtained from all three branches of service.

(APPR was built by ALCO Products, Inc., Dept. CP, 30 Church Street, New York City, N. Y. Stone and Webster Engineering Corp. served as engineer-constructor for ALCO.) ■

Cut your piping costs with CRANE corrosion-resistant valves



Split-wedge disc gate
Crane trunnion-mounted split-wedge disc combines benefits of free rotation, uniform seat load distribution. Minimizes galling, seizing.

Swing check Y-pattern
Seating surfaces can be reground with valve in line. Screwed cap permits easy access. Slot in disc spud permits rotation of disc.

Swivel disc globe and angle
Stem connection in globe and angle valves permits the disc to swivel freely on contact with seating surface. Minimizes galling, seizing.

Are your alloy valve replacement costs too high? Do you have trouble preventing product contamination?

Thousands of processors who must handle and control the flow of corrosive fluids in production have solved these problems effectively with Crane alloy valves—18-8 SMo stainless steel and Craneloy 20.

These valves, in addition to providing high resistance to corrosion and protection from product contamination, also have construction and operating features that are unequaled in cutting maintenance and installation costs.

For complete information about Crane alloy valves for processing industries—application recommendations, materials, sizes, ends available, and companion fittings—write to the address below, or ask your Crane Representative.

Send for Circular 2080 today.

CRANE VALVES & FITTINGS

PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

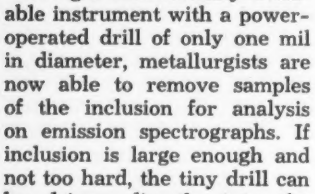
When inquiring check 4680 opposite last page

Tiny drill removes, helps to identify inclusions

Power-operated micro drill is only one mil in diam

Tiny foreign bodies, called inclusions, have long plagued metallurgists trying to perfect alloys. Source of these impurities has always been difficult to run down.

Using a commercially-available instrument with a power-operated drill of only one mil in diameter, metallurgists are now able to remove samples of the inclusion for analysis on emission spectrographs. If inclusion is large enough and not too hard, the tiny drill can be driven directly into the material and the cutting used for analysis. If inclusion is extremely small or intensely hard, then it is necessary to drill a series of holes around the deposit and lift it out of its surroundings.



Microdrill removes impurities, helps metallurgists perfect alloys

The inclusions show up along the grain boundaries or within the crystal itself. The size of some of the smallest run between three and five mils in diameter.

The "Lilliputian" process has proved quite valuable. For example, inclusions were appearing in the welds of silver-plated bus bars. No metallic elements were found upon analyzing a sample of the material. Engineers concluded that the material must be carbon. Checking back on

Why **DYNALOG*** *design is out front of all electronic potentiometers . . .*

IT GIVES STEPLESS, CONTINUOUS BALANCING!

Advance features to improve control of temperature, pressure, flow . . .

1. No periodic maintenance
2. No dry cell—no standardizing
3. No high-speed moving parts
4. No slidewire or galvanometer
5. *Stepless*, continuous balancing
6. Adaptable to narrow spans

FOXBORO
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DYNALOG
ELECTRONIC INSTRUMENTS

Here's precision in motion . . . the smooth, continuous balancing action of a Dynalog Electronic Instrument! No slidewire with faltering step-by-step inaccuracies . . . no sliding or rubbing contacts. Instead, a simple, variable, radio-type capacitor and positive magnetic drive. It's friction-free, wear-free.

That's why Dynalogs respond almost instantly to the slightest change in a process variable, with a sensitivity of 1/100 of 1% of scale . . . accuracy of ¼ of 1% of scale. It's also the reason they're the maintenance man's dream. About all he does is supply ink and charts!

Dynalogs are used with any primary element—resistance, voltage, capacity, inductive. They perform with effortless accuracy, even on control and recording problems that conventional balancing-type instruments can't handle. For the complete story, write for Bulletin 20-10. **The Foxboro Company, 817 Neponset Ave., Foxboro, Mass., U.S.A.**

*Reg. U. S. Pat. Off.

When inquiring check **4681** opposite last page

manufacturing process, they found that the bars were coated with wax, and during the welding process the material sputtered out, leaving deposits of carbon in the weld. Specifications were changed requiring bars to be degreased before the welding procedure.

(Microdrill is used in Materials Engineering Dept., Westinghouse Electric Corporation, Dept. CP, Pittsburgh 30, Pa.)

Valve problem solved with Teflon seals

Costly seal problem on air shut-off valve used in F-86 Sabre Jet fighter was solved through use of molded Teflon ball seals. Motor-operated shut-off valve controls air flow in vital part of aircraft. Even when subjected to extreme temperature ranges from −65°F to 350°F, and pressures as high as 350 psi, Teflon seals withstand severe service conditions, permitting aluminum ball in shut-off valve to operate freely.

(Teflon seal is available from Sparta Mfg. Co., Div. of United States Ceramic Tile Co., Dept. CP, Dover, Ohio . . . or for more information check 4682 on form opposite last page.)

Thanks to Harold Money, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware

Parts in process can be

PROTECTED FROM CORROSION

with SOLVAY SODIUM NITRITE

Parts in process are protected against rust if you treat them with an inexpensive, low-concentration solution of SOLVAY Sodium Nitrite. Both of the gears above were stored under *identical* conditions of high humidity—the gear at the right was protected by dipping in a 3% solution of SOLVAY Sodium Nitrite before storage.

SOLVAY Sodium Nitrite prevents corrosion on metal surfaces by forming an invisible gamma oxide protective film. It can be applied in solution by dipping or spraying, or can be added to the water in circulating systems. It is effective with iron and steel, and is reported to suppress the degradation of aluminum, tin, monel, copper and brass. It can be combined with caustic soda or phosphates for increased protection during or following cleaning, neutralizing or other operations. Easy to apply . . . SOLVAY Sodium Nitrite is non-toxic in concentrations normally used for corrosion prevention.

For a working sample and complete details of SOLVAY Sodium Nitrite's adaptability to a wide range of anti-corrosion uses, mail the coupon promptly.

Soda Ash • Caustic Soda • Calcium Chloride
Chlorine • Potassium Carbonate • Sodium Bicarbonate • Caustic Potash • Chloroform
Ammonium Bicarbonate • Cleaning Compounds
Ammonium Chloride • Sodium Nitrite • Aluminum Chloride • Snowflake® Crystals • Methyl Chloride
Monochlorobenzene • Para-dichlorobenzene • Vinyl Chloride • Ortho-dichlorobenzene • Hydrogen Peroxide
Methylene Chloride • Carbon Tetrachloride

SOLVAY ®

Write for sample . . . full facts!

Allied Chemical

SOLVAY PROCESS DIVISION
ALLIED CHEMICAL & DYE CORPORATION
61 Broadway, New York 6, N. Y.

Please send me without cost*:

☐ Working sample of SOLVAY Sodium Nitrite

☐ Booklet—"Sodium Nitrite for Rust and Corrosion Prevention"

Name_____

Position_____

Company_____

Phone_____

Address_____

City_____ Zone_____ State_____

DS-7 *In Western Hemisphere countries only.

When inquiring check 4683 opposite last page

THF

8c/gal.

with Solvent Recovery

Tetrahydrofuran has unusual solvent action for high molecular weight PVC resins. Using THF as the active solvent, such hard-to-dissolve vinyl polymers can be used to produce excellent top coatings, plastic sheeting, stronger films and other protective coatings.

With a Barnebey-Cheney package solvent recovery system, this superior solvent can still be economical. Direct cost of recovering THF is 8c/gal.

For full details, write for free Bulletin 821-51.

ACTIVATED CHARCOAL is the modern Alchemist that transforms waste vapors into useable solvents.

ACTIVATED CARBON
Purification & Recovery Equipment
BARNEBEY-CHENEY

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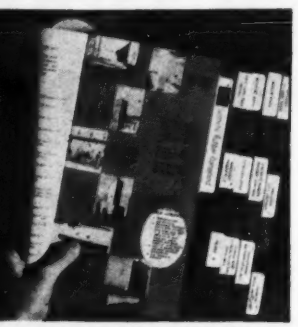
Los Angeles • San Antonio • St. John's, Quebec

When inquiring check 4684 opposite last page

YOURS FREE!



New catalog helps solve your structural sealing and protective coatings problems.

- Tells how to protect metal, masonry and wood against acids, alkalies, alcohol, oils, gasoline, solvents, salts and water with DEL Coatings.
- Describes how DEL Synthetic Rubber Compound solves the problem of joining metal, wood, masonry and glass in a *permanent, weathertight* seal.
- Carefully tabulated and organized to help corrosion, construction and chemical engineers and architects find the *right* product for each structural sealing and protective coating problem.

For a free copy of this new, easy-to-use catalog, write today!

DEL PROTECTIVE COATINGS

DAVID E. LONG CORP., DEPT. CP-77
220 East 42nd St., New York 17, N. Y.

Please send me FREE, your new catalog on DEL Protective Coatings and DEL Synthetic Rubber Compound.

Name ..... Title .....
Company .....
Address .....
City ..... Zone ..... State .....

When inquiring check 4685 opposite last page

Large solar furnace to give simulated atomic heat

Temperatures equal to those generated by an atomic explosion will be produced by giant solar furnace being erected at Quartermaster Research and Engineering Center, Natick, Mass. Energy equivalent to approximately 28 kw will be produced by the unit. It is expected to reduce time and cost of developing heat-resisting materials.

Device will be used for laboratory testing of materials designed for protecting military personnel against thermal effects of nuclear and other weapons. Standard sources of intense heat, such as high-current electric arcs, gas-fired panels, burning magnesium, and incandescent lamps are not adequate for this work. They are not hot enough, do not uniformly cover large enough area, and are not easily controlled.

Furnace installation consists of four principal elements: heliostat, concentrating mirror array, attenuator, and test chamber. These will occupy an area about 125 by 40 ft.

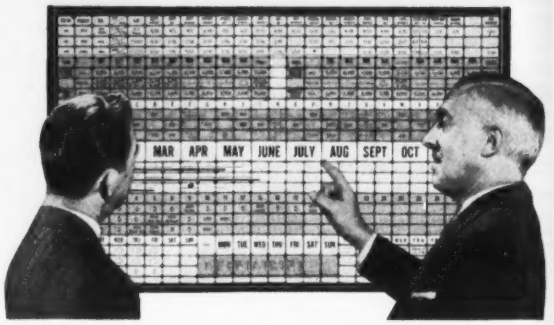
Heliostat, a flat mirror 40 x 36 ft, will reflect sun's rays a distance of 96 ft upon concentrating mirror array at other end of assembly. Automatic positioning system drives heliostat, and keeps it constantly at correct angle with sun. Directly reflected rays will always illuminate concentrator regardless of time of day, month, or year.

(Information courtesy of Department of the Army, Chief of Information, Dept. CP, Washington 25, D.C.)

Price lists of AEC reports

Cumulative listing of more than 3600 AEC unclassified research reports contains 454 items acquired since June 30, 1956. To obtain AEC research reports price list 27, write direct to Office of Technical Services, United States Department of Commerce, Washington 25, D.C.

You Get Things Done Better By Seeing What's Happening



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FREE **24-Page Illustrated Booklet AA-20 Without Obligation**

GRAPHIC SYSTEMS, 55 West 42nd St., New York 36, N.Y.

When inquiring check 4686 opposite last page

alphabetical index on page 244

. . . for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 244. "Quick-locator" starting on that page was a feature in CHEMICAL PROCESSING years ago. It means extra work for the Editors, but it helps you, the reader, in finding what you want . . . in a hurry!

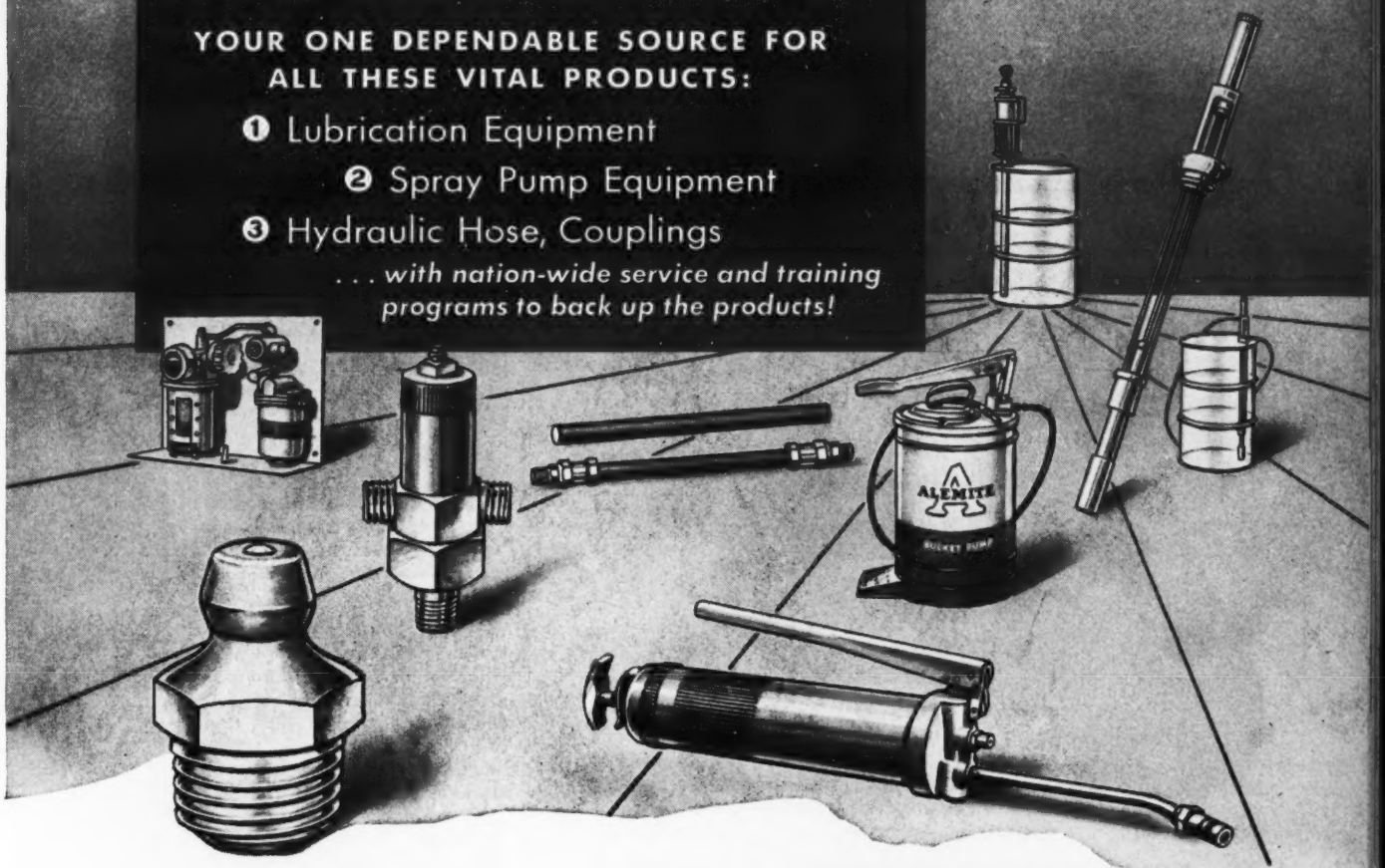
MORE THAN THE LUBRICATION LEADER . . .

ALEMITE®

YOUR ONE DEPENDABLE SOURCE FOR ALL THESE VITAL PRODUCTS:

1. Lubrication Equipment
2. Spray Pump Equipment
3. Hydraulic Hose, Couplings

. . . with nation-wide service and training programs to back up the products!



Cut Lubrication Costs up to 64%! Alemite offers the widest choice of lubrication fittings on the market—time-saving pumps and guns for handling of lubricants—fully automatic airborne mist lubrications systems—centralized systems for both oil and grease.

Apply Materials 30% Faster!—If you use any material that is received in a drum—paint, putty, caulking, even food products . . . Alemite can pump direct from the drum to point of application for spraying, extruding, transfering, packaging!

Protect Hydraulic Systems!—Alemite offers a complete line of non-skive, reusable high pressure hose and couplings for *any* hydraulic system.

And Alemite backs up these products with service points from coast to coast—with free training programs and plant surveys that will save money for *your* company!

For free catalogs and complete information, write Alemite, Dept. K-77, 1850 Diversey Parkway, Chicago 14, Ill.

STEWART SW WARNER

ALEMITE

REG. U. S. PAT. OFF.

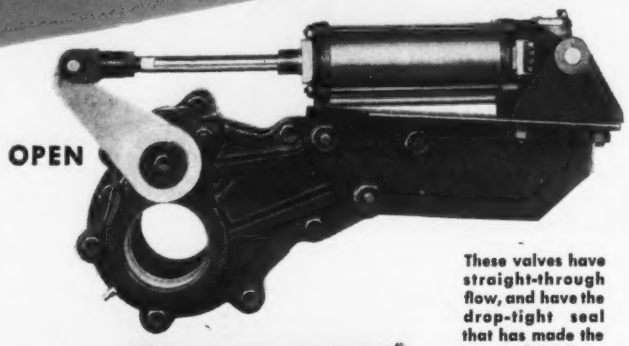
Division of STEWART-WARNER CORPORATION

Alemite is the only *single source* for all these famous products:

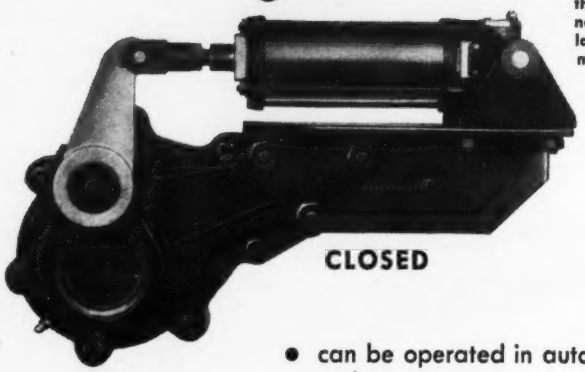
OIL-MIST	Automatic Airborne Lubrication System
Centralized Lubrication Systems — Accumatic	
red•ball	Hydraulic Lubrication Fittings
Barrel Pumps for Oil and Grease — "POWERHOUSE"	
"BARREL-TO-BEARING"	Manual and Power Operated Pumps and Guns
Spray Pump Equipment — ALEMITE Versatal	
SURGEPRUF	Hydraulic Hose and Couplings

For more information on product at right, specify 4687 see information request blank opposite last page.

For accurate control of process work



These valves have straight-through flow, and have the drop-tight seal that has made the non-wedging Everlasting Valve famous for 50 years.



Write for complete information on these important features.

- can be operated in automatic cycles
- can be remotely controlled, electrically or manually
- can be operated by air or hydraulically
- can be regulated to operate at any speed
- eliminate operator fatigue
- allow multiple valve operation by one man

EVERLASTING VALVE CO.
73 FISK STREET JERSEY CITY 5, N. J.

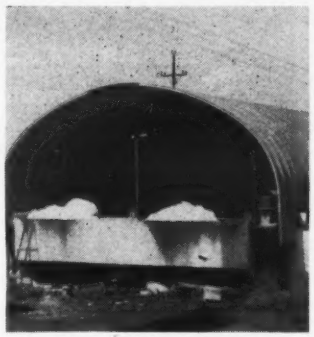
EVERLASTING CYLINDER-OPERATED Valves

EV-401

When inquiring check 4688 opposite last page

Water tank protected by trussless building that's economical

Problem: The Flower City Tissue Mills Co., Rochester, N. Y., had an uncovered outdoor water-treatment tank that was located in an area between two railroad tracks. Vandals had a habit of throwing large cinder clinkers and stones into the tank, which would interrupt the automatic skimming equipment and cause much damage. And rain falling into open tank would drive floating materials (to be skimmed off) into clean water storage. Moreover, the City of Rochester insisted that the tank, which held a depth of 16 ft of water, be covered or fenced in as a safety measure.



Building covering outdoor tank has no inner supports to interfere with water-treatment

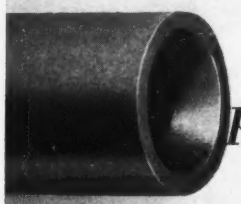
Solution: Company started to look for something with which to cover the tank . . . something which had low initial cost and was easy to install without interrupting the water-treatment operation. A pre-engineered trussless steel building met these requirements. This structure consists primarily of curved sections of 18-gage corrugated, galvanized steel sheets. Sheets are shaped according to a design which results in a building having an interior without supports, beams, trusses, or pillars. The sheets are held together by nut and bolt fasteners.

Results: Building has afforded an economical means of covering the tank with a sturdy structure. Water is kept pure and dirt-free.

kraloy plastic pipe

KRALOY
KRALOY PLASTIC PIPE CO., INC. Los Angeles California

protects product



purity

Kraloy PVC Plastic Pipe used in your plant will deliver your product clean and pure. You particularly need Kraloy PVC (which cannot scale or corrode) if your product or any of its components react to metallic pipe and acquire impurities from it. Clean as glass, KRALOY PVC PIPE is proud to have been granted the approval of the National Sanitation Foundation.

Kraloy PVC High Impact Plastic Pipe and Tubing will deliver most liquid and gaseous chemicals with higher efficiency and less maintenance and policing than any other standard piping material. Superior flow characteristics (C factor=150+) eliminate problems concerned with fatty acids and other fats, oils, and syrups, and guarantee high flow rates with lower head loss. Ph factors from 2 to 13 are all the same to KRALOY PVC. Bends and other fabrications are easy. Abrasion? Send us your specifications, bearing in mind that KRALOY PVC PIPE is already used in many slurry installations. Instrument and instrument-control pipe and tubing, too.

Write for detailed brochure, and name of your factory representative nearest you.

KRALOY PLASTIC PIPE CO., INC.
4720 E. Washington Blvd., Los Angeles, Calif.

KRALOY
KRALOY PLASTIC PIPE CO., INC. Los Angeles California

Subsidiary of the Seamless Rubber Co. a Rexall Drug Co., Subsidiary KP-110

When inquiring check 4689 opposite last page

Skimming equipment is protected and there is no fear of anyone falling into the tank.

(Trussless steel building is product of Wonder Building Corp. of America, Dept. CP, 30 N. LaSalle St., Chicago 2, Ill. Check 4691 opp. last page.)

Management 'war game' for executive training

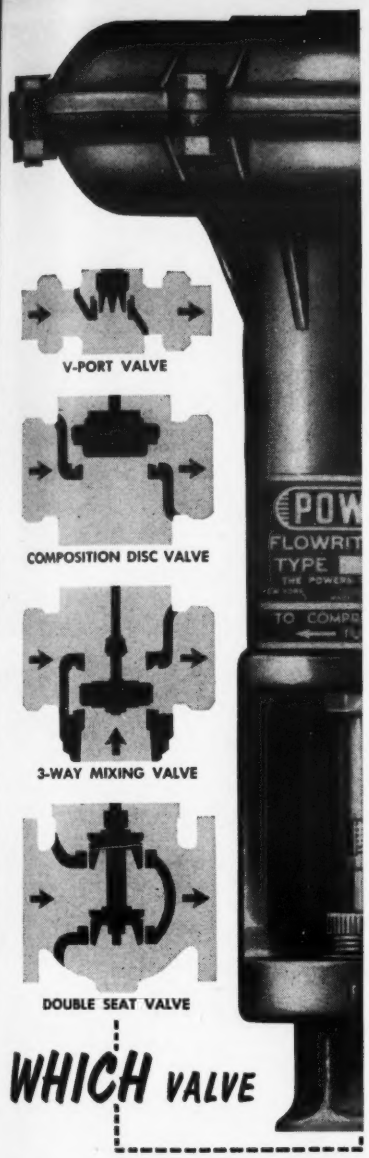
Patterned after war games conducted by armed forces

A new executive training device has been developed to give top management men intensive practice in the analytical techniques of decision making. Basically, it is a business "war game" patterned after the war games conducted by the armed forces. It is designed to provide conditions under which a few hours of concentrated decision making under pressure will simulate years of business experience.

The game was recently previewed in New York City for a selected group of corporation presidents. Executives were given an opportunity to make decisions in areas outside their own specialty. For example, a man in charge of advertising would make the decisions faced by a company president. A group of cause-and-effect formulas determined results of each move made by players.

Game begins when five competing teams, consisting of three or four players each, receive basic operating information. This is on a form reporting how much money each company has and what it can spend it on. All five companies are assumed to be manufacturing the same product, and only that product. At start, each has exactly one-fifth of market, exactly the same dollar value of assets, and exactly the same range of choices available.

Players are given specified amount of time to make decisions for each quarter, ranging from 25 minutes for first quarter to 10 minutes for last. Cycle is repeated until the

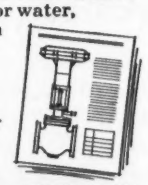


WHICH VALVE

is best for your Control Problem?

Ask your nearest Powers representative which particular valve should be specified—he knows diaphragm control valves and their applications. You'll find him ready to help you in sixty-six cities throughout the nation.

Four Powers Flowrite Valve types are available to meet every requirement for accurate and dependable control. Actuated by compressed air or water, they may be used with any pressure-operated sensing device.



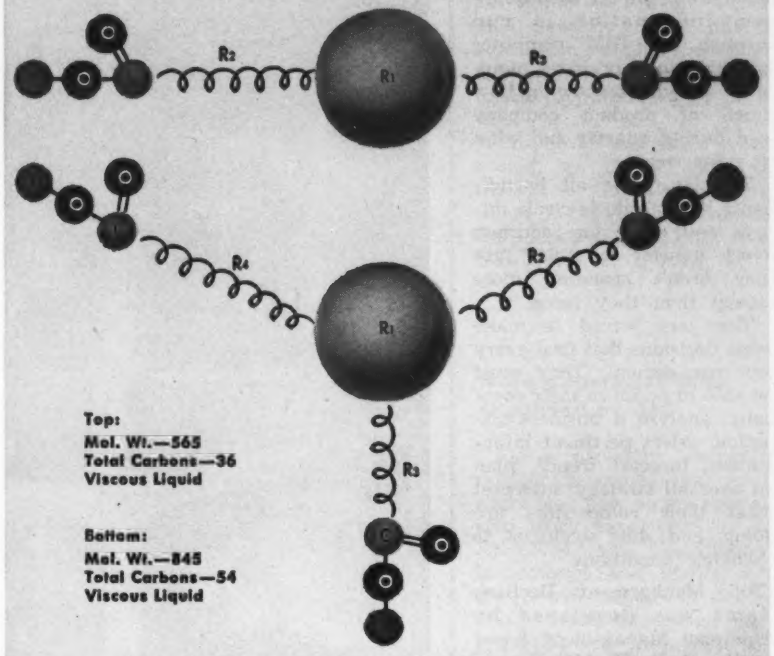
WRITE TODAY for information on all four valve types . . . ask for Bulletin No. 344.
DEPT. 757

THE POWERS REGULATOR CO. • SKOKIE 16, ILL.

POWERS

When inquiring check 4690 opposite last page

Want a Di- or Polybasic Acid that is DIFFERENT?



Then try EMPOL® POLYMERIZED ACIDS!

Relatively low in cost, these viscous liquids offer a very unusual combination of high molecular-weight and polyfunctionality that should be of extreme interest to manufacturers of resins, polyesters, polymers and similar type materials for many fields of application. Such fields already include adhesives, coatings, corrosion inhibitors, de-emulsifiers, emulsifying agents, films, foams, lube additives, elastomers and surface coatings.

In addition to commercial Empol 1022 which contains 75% dibasic and 22% tribasic acids, Emery offers several "development" grades that are essentially all dibasic or tribasic. This added flexibility of composition offers additional opportunities for research in new fields as well as the fields where the commercial product is already used. Mail coupon below for complete literature on Emery Polymerized Acids.

Emery
Organic Chemical Sales Department

Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio

Emery Industries, Inc., Dept. K7, Carew Tower, Cincinnati 2, Ohio
Please send literature on Emery Polymerized Acids. I am especially interested in ☐ dibasic, ☐ polybasic materials for.....
Name.....Title.....
Company.....
Address.....
City.....State.....

When inquiring check 4692 opposite last page

equivalent of three business years has elapsed. After decisions are made for each quarter, information is run through an IBM computer which, in turn, prepares quarterly statement showing how much of product company sold during quarter and what its costs were.

To play game all participants have to do is circle figures and make one addition every quarter to make sure they aren't spending more money than they have.

They are forced to make same decisions that face every top management. They must be able to organize their company, analyze a business situation, select pertinent information, forecast trends, plan an over-all strategy, interpret what their competitors are doing, and shift strategies to changing conditions.

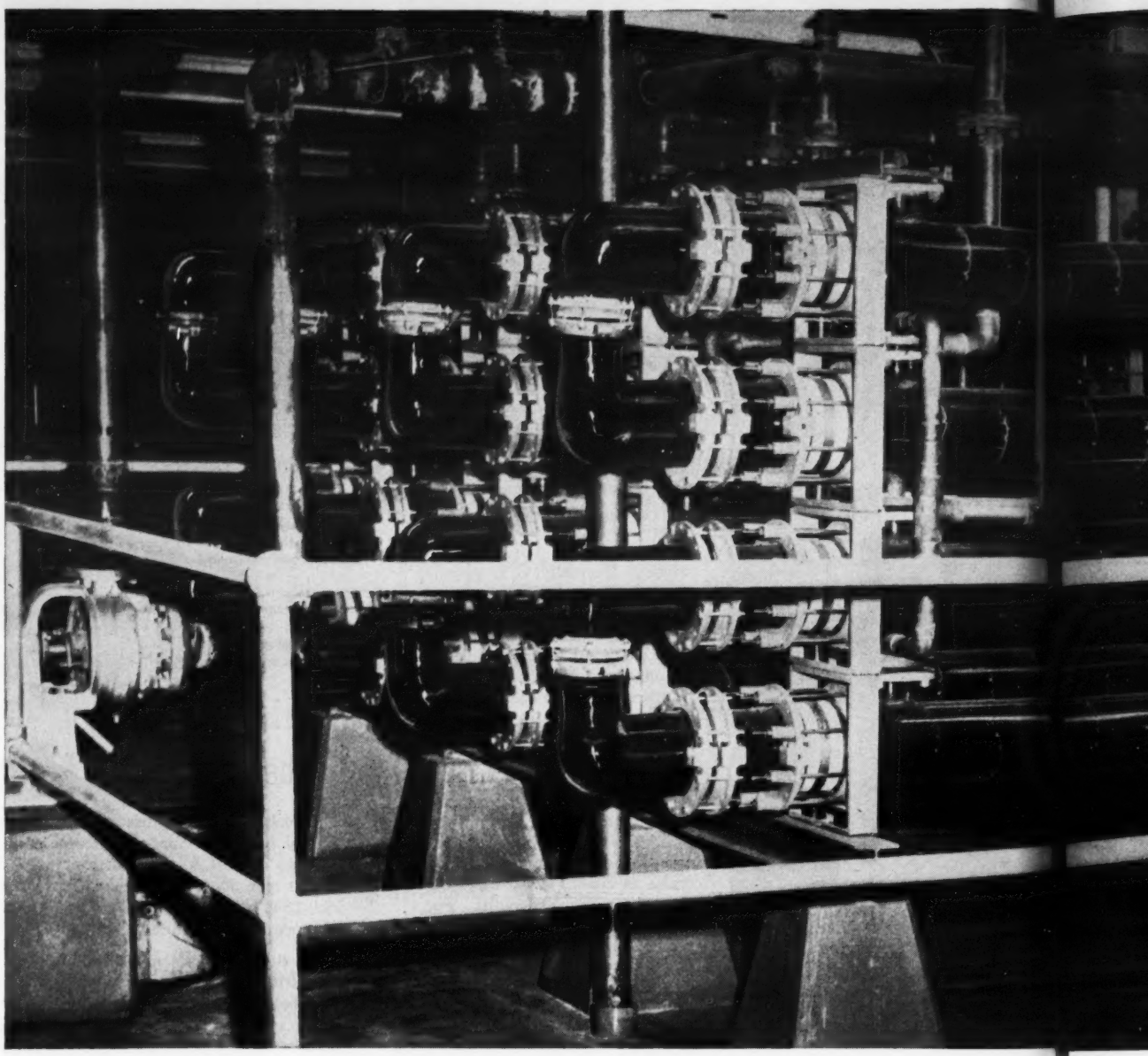
(Top Management Decision Game was developed by American Management Association, Dept. CP, 1515 Broadway, Times Square, New York 36, N.Y. Check 4692A opposite last page.)

Details optical plastics

Two reports describe three classes of materials — plastics, elastomers, and coatings — that are clear and have abrasion resistance approaching that of glass. Report PB 121027 has 38 pages, costs $1. Report PB 121028 has 14 pages, costs 50c. Order direct from Office of Technical Services, US Dept. of Commerce, Washington 25, D.C.

Phosphoric acid plant on stream at Tuscola

Phosphoric acid plant, built primarily for supplying acid to fertilizer manufacturers, is in operation at Tuscola, Ill. Production capacity of plant is 30,000 tons per year, expressed as P_2O_5 (equivalent to approximately 60,000 tons per year of 75% phosphoric acid). The "wet process" acid is made from phosphate rock



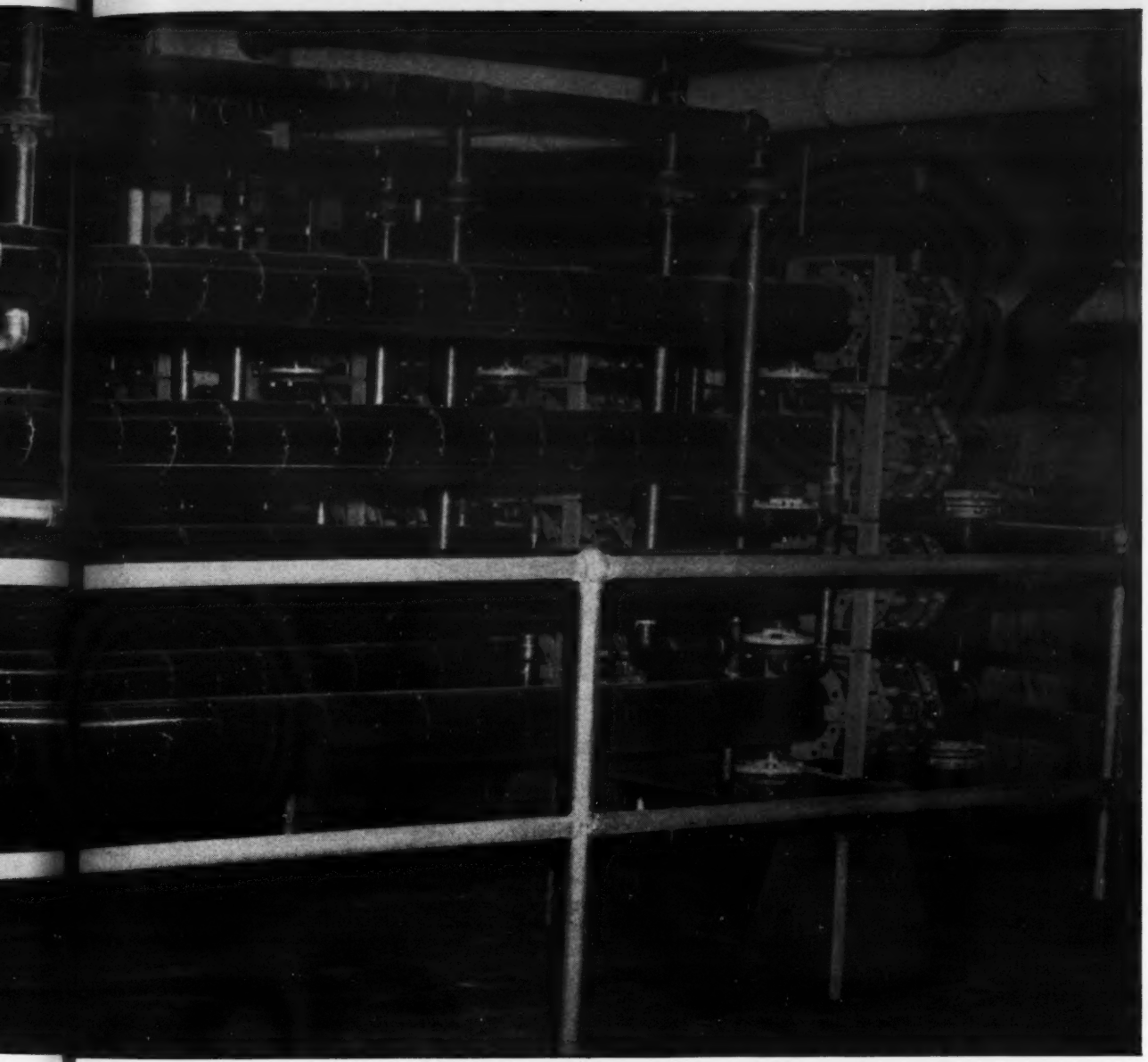
Glass puts lost b.t.u.'s back to work

16 standard Heat Exchangers save over 7½ million b.t.u./hour from hot corrosive wastes

Heat was going down the drain at the Sevier, North Carolina finishing plant of The American Thread Company . . . and because of overly high peak loads on the boilers something had to be done about it.

If the heat could be picked up from the dye liquor waste and used to preheat the incoming fresh water, the problem would be solved. The difficulty was the corrosive nature of the waste.

PYREX® heat exchangers were the natural choice. In the first place, because the corrosive liquid comes in contact with nothing but glass and the resistant gaskets, corrosion is no problem. The glass is light and easily handled. It's easily installed, easily replaced. Heat transfer is high. Sediment build-up is slowed up. If it does occur, its presence is immediately apparent because of the transparency of PYREX pipe.



16 50 sq. ft. standard PYREX brand shell and tube exchangers are stacked four high and spaced in four groups horizontally. Corrosive dye liquor makes passes through the tubes of all four units. Fresh water makes one pass through the shell of each unit.

If you can use the properties of PYREX brand glasses to effect similar savings in your plant operations, why not send for Corning's detailed engineering reference guide, "Design Manual for PYREX brand Modular Shell and Tube Heat Exchanger Units." Just send coupon, or write Plant Equipment Sales, Corning Glass Works, Corning, N. Y.

CORNING GLASS WORKS
37 Crystal Street, Corning, New York

Please send me Bulletin PE-33, "Design Manual for PYREX brand Modular Shell and Tube Heat Exchanger Units."

Name.....
Title.....
Company.....
Street.....
City.....Zone.....
State.....

Corning means research in Glass **CORNING GLASS WORKS, 37 Crystal Street, Corning, N.Y.**

When inquiring check 4693 opposite last page

and sulfuric acid using a process licensed from S. A. Metallurgique de Prayon, a Belgian company. Spent sulfuric acid from neighboring plant is used. Sodium silicofluoride is also produced as a by-product.

(Phosphoric acid plant is operated by U. S. Industrial Chemicals Co., Div. of National Distillers Products Corp., Dept. CP, 99 Park Ave., New York 16, N. Y.)

Work experience plan expanded by AEC

More privately employed nuclear scientists and engineers may now obtain specialized work experience in the Atomic Energy Commission's laboratories and plants with the recent expansion of the AEC's work experience program. To help train more nuclear scientists and to aid in the further development and use of atomic energy for peaceful purposes, the program is now on a regular, systematized basis.

Firms and organizations interested in the program should address inquires to the Commission's field operations office having jurisdiction over facility in which work experience is sought. Inquiry may be made, too, of the Director, Division of Civilian Application, Atomic Energy Commission, Washington, D.C.

(Information courtesy of Atomic Energy Commission, Washington, D.C.)

Nuclear fuel elements

Detailed discussion of special equipment used in rolling and fabricating new metals required for atomic energy program is contained in 12-page booklet. Problems regarding avoidance of radiation hazards and special rolling techniques are covered. "Rolling Mills for Processing Nuclear Fuel Elements" — Stanat Mfg. Co., Inc., Dept. CP, 500 Shames Drive, Westbury, New York. Check 4694.

It's easier to solve your conveying problems *with*

DIAMOND *Conveyor Chain*

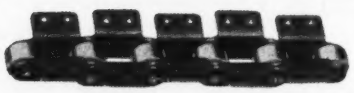
DIAMOND Conveyor Chain's high operating efficiency, precision and versatility make it ideal for conveying and automated operations of all types.

Conveying and synchronizing problems—such as automatic assembly, filling, packaging and folding—are speedily solved by DIAMOND Chain's uniform pitch and smooth action. A wide range of extended pins and attachments permits almost any interval or sequence set-up desired.

For conveying, lifting and transporting—DIAMOND'S toughness, efficiency and long service life help reduce operating and service costs, minimize maintenance.

Where corrosion or product contamination is a problem—DIAMOND Stainless Steel Conveyor Chain supplies the answer.

STRAIGHT ATTACHMENT—one side



BENT ATTACHMENT—both sides

BENT ATTACHMENT—one side

EXTENDED PIN—one side

● Your nearby DIAMOND Distributor can supply all types of conveyor chains and sprockets, plus expert engineering assistance to solve special conveying problems. Look under "Chains" or "Chains, Roller" in the YELLOW PAGES . . . or write to factory for Conveyor Catalog and name of your nearest Distributor.

DIAMOND CHAIN COMPANY, INC.

402 KENTUCKY AVENUE, INDIANAPOLIS 7, INDIANA

Offices and Distributors in All Principal Cities

When inquiring check 4695 opposite last page

Neutron shield, 1/4" thick, does job of 26" concrete

Has core of boron carbide dispersed in aluminum

Uses: As neutron shielding medium for nuclear reactors and other thermal neutron generating devices.

Features: Where space or weight limitations are involved, product offers real advantages. Plate, 0.250" thick, can be used to replace 26" of regular concrete.

Description: Boral sheet and plate is a composite consisting of a core of boron carbide dispersed in pure aluminum, and clad on both sides with 1100 alloy.

Standard sizes available are 48x120" and 36x96". Thicknesses are 0.125" and 0.250". Heavier material weighs 3.30 lb per sq ft. Thinner plate weighs 1.65 lb per sq ft. Nominal cladding thickness is 0.020" on each side for 0.125" product, 0.040" on 0.250" material.

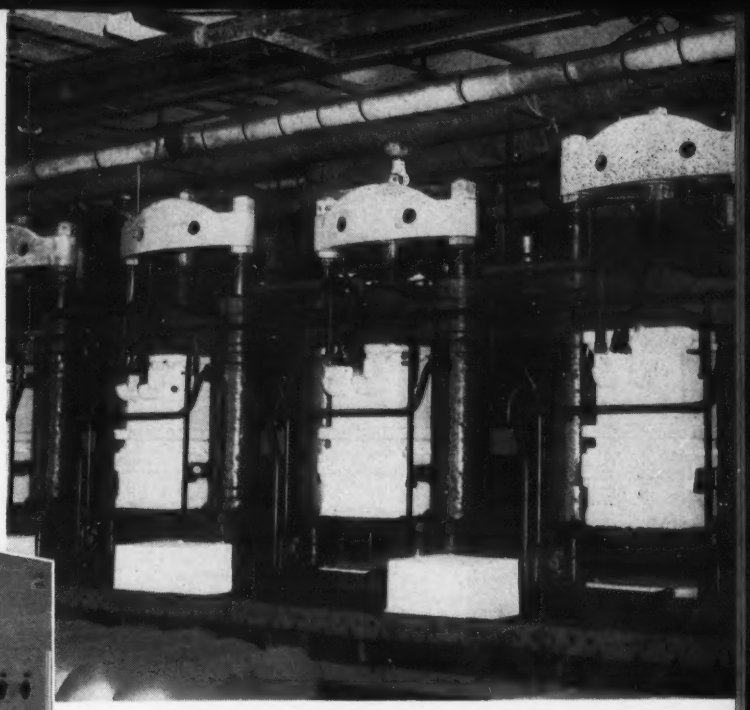
Boron carbide (B_4C) content is 23% (by weight) of composite, or about 35% by weight of the core. Nonstandard sizes are also available.

(Boral sheet and plate is product of Aluminum Co. of America, Dept. CP, 1200 Alcoa Building, Pittsburgh 19, Pa. . . . or for more information check 4696 on form opposite last page.)

Ten-year old dry ice plant was modernized . . . by installation of control system and custom-built motor operators. This package-designed . . .

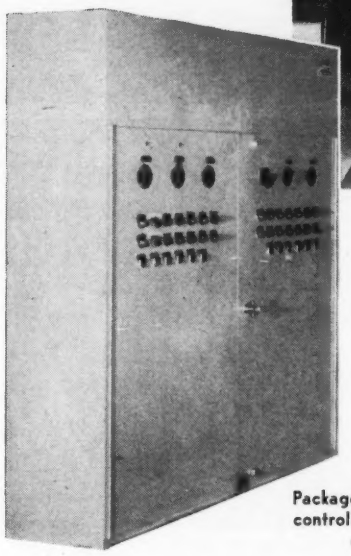
time-cycle control system duplicates manual operation

with greater safety and flexibility . . . gives a superior product



Four presses discharging dry ice blocks onto conveyor

WILLIAM C. CLARKE, Assistant Editor
NORMAN H. CALLNER, Chief Engineer
The Liquid Carbonic Corporation
Chicago, Illinois



Package control center and control system modernized dry ice plant

Problem: Vicious valve-twisting program was required to operate six 250-ton dry ice presses at Liquid Carbonic's Belleville, N. J., plant. Over 25 sequence operations had to be performed within a very few, short minutes — on each press — to produce each block of ice. Failure of operators to follow sequence at any one point could result in either loss of production, due to machine stoppage, or loss of product quality. Either ice density or block size could be affected.

Although dry ice plant at Belleville, N. J., was only about ten years old, management at Liquid Carbonic wanted to achieve greater product uniformity, both as to size and density, at an increased production rate. Product uniformity was desired primarily for storage, shipping, and sales purposes.

While not extremely complex, manual operation of more than 25 sequence operations for each of six dry ice presses introduced a source of production delay — because safety setup was such that once improper sequencing was commenced, entire cycle had to be stopped and cleared. Six presses operated in similar manner.

Solution: Engineers essentially duplicated the manual operation. Major components in installation are a control center containing all controls for the six presses, and custom-built four-position motor operators. Mounting brackets and linkages are designed so operators are coupled to existing hand-operated three-position hydraulic valves.

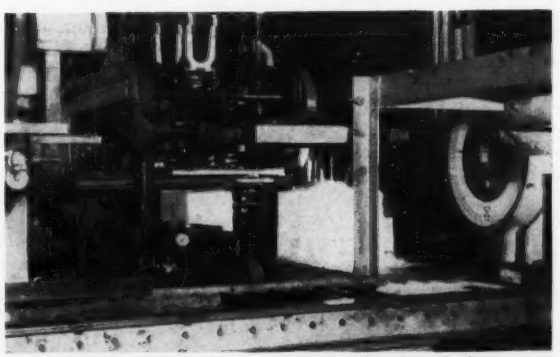
In making dry ice, liquid carbon dioxide goes through several evaporation stages where it is further refrigerated and finally solidified into a snow. Familiar blocks of dry ice are formed by mechanically pressing of the snow.

Basic cycle of manual ice-making consisted of several simultaneous operations. These required opening and closing of ten two-position valves and twelve three-position valves.

When each press completed making its block of ice, the block was manually pushed from each open press. Occasionally, two men were required to pry loose a "stuck" block. Then, operator had to sweep loose chips clear of lower platen, to prevent a leaky seal on closing.

Key to problem of matching manual operation of presses was a careful analysis of manual motions required. Press-time cycle was broken down into a number of components and tied automatically in with the simultaneous operation of auxiliary equipment. Then each cycle operation was made inter-dependent on each other.

Turn to next page



Blocks are scaled and cut automatically after discharge from presses

Time-cycle Control

Starts on preceding page

Although basic refrigeration cycle is simple, many intermediate control points are designed into control center for protection of equipment and production of a superior product. An overall safety system in control center is based on use of tandem "filling timers". Should one timer fail to "run out" due to mechanical or electrical failure, second timer will cause action to protect system. Timer failure is then detected because cycle will stop until trouble is found and corrected.

Interlock circuits are incorporated into safety system which cause boildown valve to close after a predetermined period. Should failure occur at this point, operation cycle also stops until faulty valve or interlock has been manually cleared.

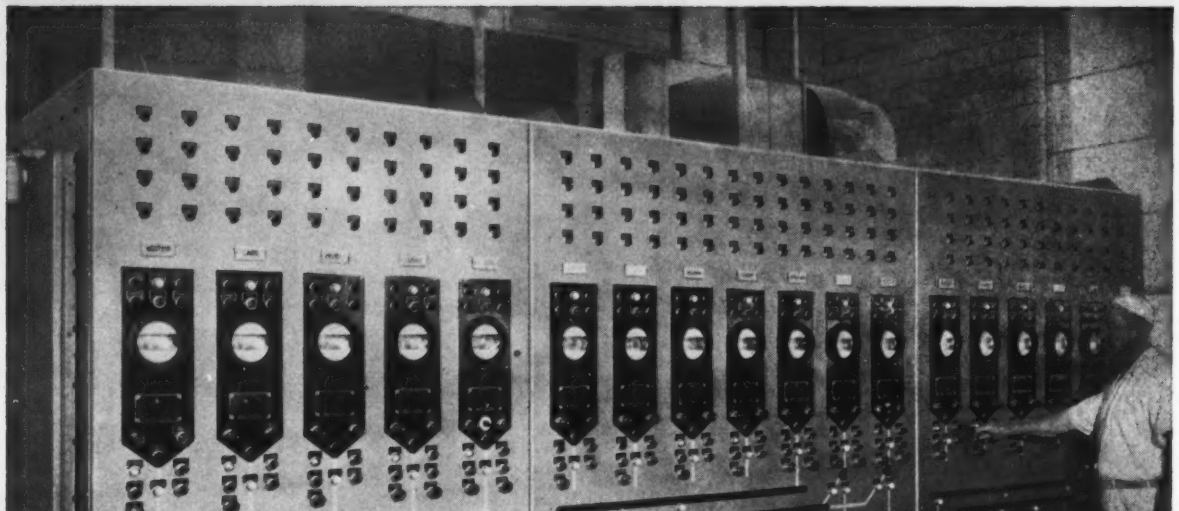
Allowing flexibility in press operation, control center permits presses to be either "on stream" or on standby. All or any one (or more) of six presses can be on automatic cycle.

To allow all limit switches on presses to be standard water-tight models easily replaced and serviced, relays contained in control center operate to "multiply" their action. All timers and latch relays for major steps of operational cycle are non-reset on power failure. Power interruptions hold conditions "as is" or "fail-safe" at all points. All critical valves shut on power failure and reopen with return of power and continuance of cycle.

Each motor operator positions a top or bottom ram as signalled by control center. Rams can be raised, lowered, or neutralized (motion stopped and held in a given position).

To efficiently handle tonnage produced by six presses, motor-driven conveyor behind battery of presses leads to automatic sawing, weighing, and wrapping equipment.

Results: Liquid Carbonic's Belleville plant has been completely automated, capable of producing sufficient dry ice



BIGGEST PROPORTIONING PANEL IN FOOD INDUSTRY

...And Adaptable to Any Industry Requiring Precise Formulation

This Richardson Select-O-Weigh system is the most complete automatic proportioning panel yet installed in the food industry.

Coupled with a conveying system, the panel controls automatic feeding of material from any of 14 flour bins, two sugar bins, and storage tanks for shortening, invert, molasses, and water. With this system, the bakery can proportion three different formulas simultaneously. Every phase of operation is clearly indicated on the panel by means of signal lights, which graphically reflect actual material flow. Ingredients can be delivered in the sequence and proportions called for by a specified formula. When each phase of this operation is completed, a signal light on the panel notifies the operator. When an ingredient is delivered to the mixer, a light beside the panel card on the board flashes. The operator knows at all times the progress of each formula being delivered to the mixers.

CONTROLS

The entire Richardson Select-O-Weigh system is interlocked with all elements it controls, so that any operation can be halted if necessary. At the beginning of each weighing cycle a "ready-start" light flashes, indicating the scale is at tare. At the conclusion of each weighing, an automatic weight check is made. Under or overweight is indicated on the control panel and scale discharge is automatically held up for correction.

For additional information on this interesting installation, and engineering assistance in automating your operation, write Richardson Scale Company, Clifton, New Jersey.

4974

Richardson

MATERIALS HANDLING BY WEIGHT SINCE 1902

RICHARDSON SCALE COMPANY, CLIFTON, NEW JERSEY

Atlanta • Boston • Buffalo • Chicago • Cincinnati • Houston • Memphis • Minneapolis
New York • Omaha • Philadelphia • Pittsburgh • San Francisco • Wichita • Montreal
Toronto • Havana • Mexico City • San Juan • Geneva, Switzerland • Nottingham, England

When inquiring check 4697 opposite last page

to supply New York, New Jersey, and lower New England areas. Quality of finished product is good, with uniform block size and density. Control system has been in use since 1955 without any more than preventive maintenance. System has been so successful that Liquid Carbonic has already equipped a number of other dry ice plants with the same control system.

(Control system and motor operators are products of Automatic Temperature Control Co., Dept. CP, 5200 Pulaski Ave., Philadelphia 44, Pa. . . . or check 4698 opp. last page.)

Wind velocity system has high resolution on slow speeds

Incorporates drag-free light-beam chopping

Uses: Measuring wind velocity and direction in applications where slow speed winds are important. Can be used for data-gathering in solving air-pollution problems.

Features: Wind-recording system has been designed for maximizing resolution of fine detail in slow speed winds, maintaining accuracies of ±4% full scale for wind speed and ±3% for wind direction.

Description: Wind-speed signals are developed by a precision anemometer with a drag-free transducer based on principle of high-speed light-beam chopping. Wind-direction transmitter uses a low-inertia potentiometer for position sensing. Resulting signals can be used with telemetered data-collection systems.

All exposed parts are made of corrosion-resistant materials. Inert-gas purging system is available for use under particularly unfavorable atmospheric conditions. Wind speed scales are 6, 12, 30, and 60 mph.

(Type F wind-recording system is product of Beckman & Whitley, Inc., Dept. CP, 960 E. San Carlos Avenue, San Carlos, Calif. Check 4699 opposite last page.)

REPUBLIC

announces a

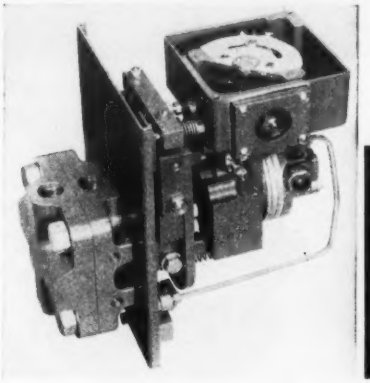
double break-through

in pneumatic transmitter rangeability!

TYPE VP

Pressure Transmitter
Standard Ranges
0-150 to 0-4000 psi
0-60" H_2O to 0-150 psi
0-1½" to 0-60" H_2O

- **Null-balance-*vector* design permits 20-to-1 range adjustment without re-setting zero!**
- **Suppression of range lower limit simply adjusted up to 50% of span!**
- **New compactness and weight saving solve most location problems.**
- **Low air consumption.**
- **Simplified, accessible mechanism for quick and easy servicing.**



TYPE VDP

Differential Transmitter
Standard Range
0-15 to 0-300" H_2O

Republic has *literally* figured all the angles to bring you this new "family" of pneumatic transmitters for pressure and differential pressure. The null-balance-*vector* units are compact, easy to install and adjust, and permit range changes far beyond any pneumatic instruments previously available to industry—and *without changing* parts. You need only a screwdriver and reference gauge to change either the upper or lower range limit!

Adjustment time is radically cut since re-zeroing of the instrument is seldom needed when the upper range limit is changed. Unusually large changes in plant operating conditions can be accommodated quickly and without new or modified equipment, simply by loosening a set screw and moving one linkage component.

Republic Type VP and VDP pneumatic transmitters normally provide standard 3-15 psi output signal pressures. Air consumption is only 0.2 scfm since air flow virtually stops as soon as the transmitter balances each input signal change. And all Republic null-balance-vector instruments have top sensitivity *and* stability. Lightweight tension members in the balancing linkage respond quickly to pressure or differential changes and do not overshoot or "hunt" the balance point.

Whether your plant conditions change frequently or you just want the best sensitivity, accuracy and reliability available in pneumatic transmitters, you should get the full details on Republic Type VP and VDP transmitters.

WRITE FOR REPUBLIC FOLIOS NO. 56-12 AND 56-13A TODAY... and keep an eye on Republic for new developments "in the works" now to help you with your most critical operating instrument problems.

REPUBLIC FLOW METERS CO.

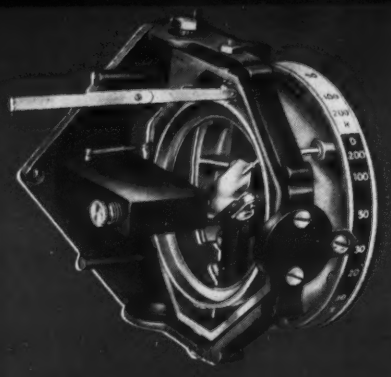
A Subsidiary of Rockwell Manufacturing Company

2240 Diversey Parkway • Chicago 47, Illinois

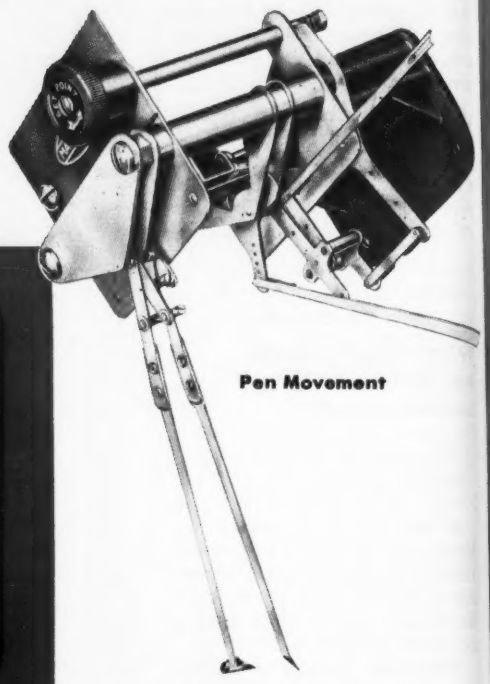
When inquiring check 4700 opposite last page

Masoneilan 60000 Series . . .

ALL-IN-ONE PN

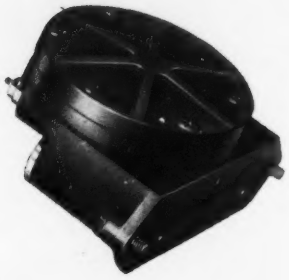


Exclusive gimbal unit combines primary and feed-back motion to provide three types of control in one instrument without change of parts — proportional on-off and differential gap, each with direct or reverse action.



Pen Movement

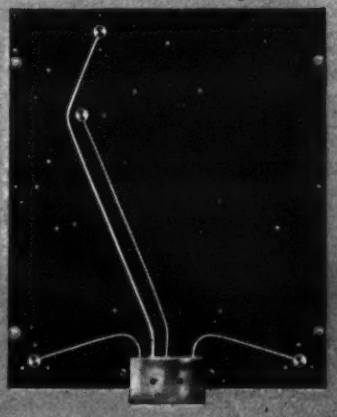
Ball and socket pivot, common axis of rotation for pen or pointer and set point index, provides maximum flexibility in adding pens and supplementary control functions. Gearless friction drive permits precise adjustment of set point.



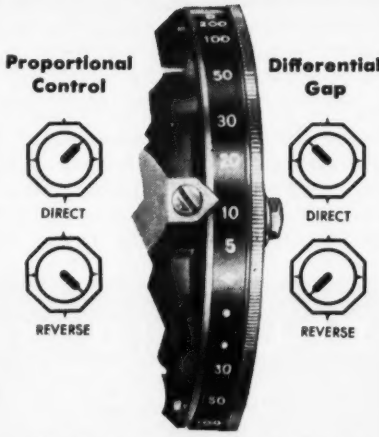
This is the Masoneilan balanced amplifying relay type pilot featuring large capacity, frictionless floating action valve and cleanable sapphire orifice.

60000 Series includes indicating controllers and transmitters, recorders and recording controllers.

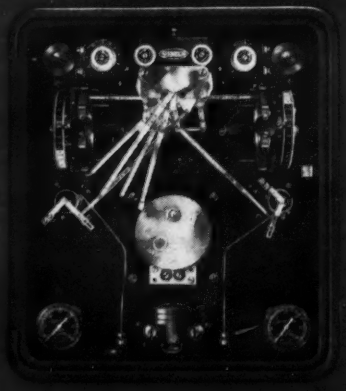
Rear view of black plate



Plug-in pneumatic units plus manifolding of air passages practically eliminate air tubing in case — assure simplicity, ready accessibility.



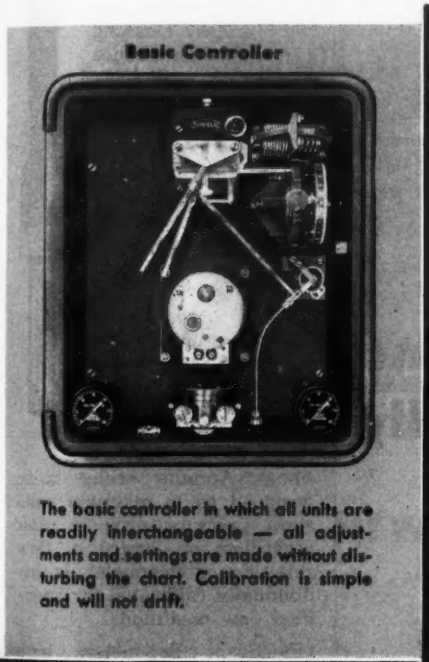
One simple adjustment of knurled wheel selects type of control and simultaneously adjusts proportional band or width of differential gap.



Availability of dust (two complete controllers), duplex (one primary element — two control mechanisms), or dual selector (two controllers with common pilot) for special purposes — in one case.

PNEUMATIC CONTROLLER

Advanced design features exclusive Gimbal Unit, plug-in pneumatic units, and interchangeable unit subassemblies — enabling selection of variety of control types and supplementary functions IN ONE CASE.



The basic controller in which all units are readily interchangeable — all adjustments and settings are made without disturbing the chart. Calibration is simple and will not drift.

The Masoneilan 60000 Series offers a basic design instrument with a wide selection of variations and combinations with which you are able to obtain accurate, dependable, pneumatic process control — however complex.

Types of Control include On-Off, Proportional, Differential Gap, Proportional-Reset, Proportional-Derivative, Proportional-Reset-Derivative.

Supplementary Functions include Pneumatic Set, Time Schedule, Differential.

Combinations possible are Dual, Dual Selector and Duplex types.

Recording, Indicating and/or Transmitting varieties are available.

The features illustrated here, plus sturdy construction, ease of calibration and adjustment, accessibility and freedom from maintenance, make the 60000 Series truly the "instrument man's instruments" and the treasurer's friends.

Ask the Mason-Neilan office nearest you for a demonstration of these advantages — or write for catalog.

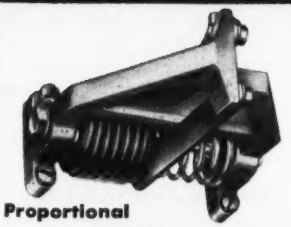
MASON-NEILAN

Division of Worthington Corporation

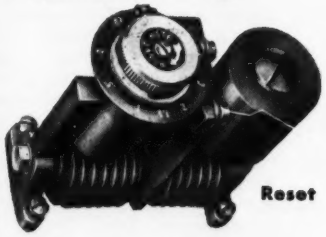
25 Nahatan Street, Norwood, Massachusetts

SEVENTY-FIFTH ANNIVERSARY 75 1883-1958

Sales Offices or Distributors in the Following Cities:
New York • Syracuse • Chicago • St. Louis • Tulsa • Philadelphia • Houston • Atlanta • Cleveland
Cincinnati • Kansas City • Phoenix • Detroit • San Francisco • Louisville • Salt Lake City • El Paso
Albuquerque • Charlotte • Los Angeles • Corpus Christi • Denver • Appleton • Birmingham
New Orleans • Seattle • Mason-Neilan Regulator Co., Ltd., Montreal and Toronto

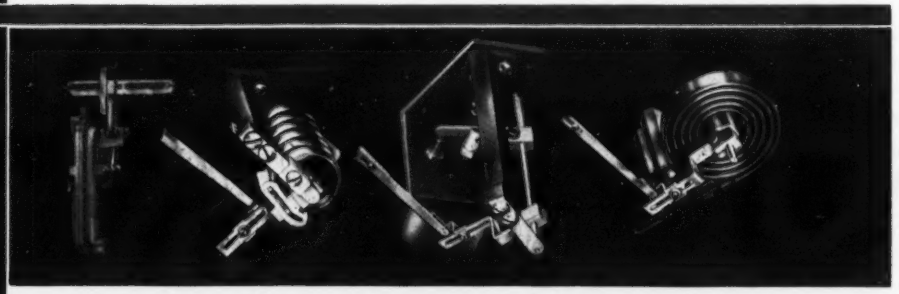


Proportional



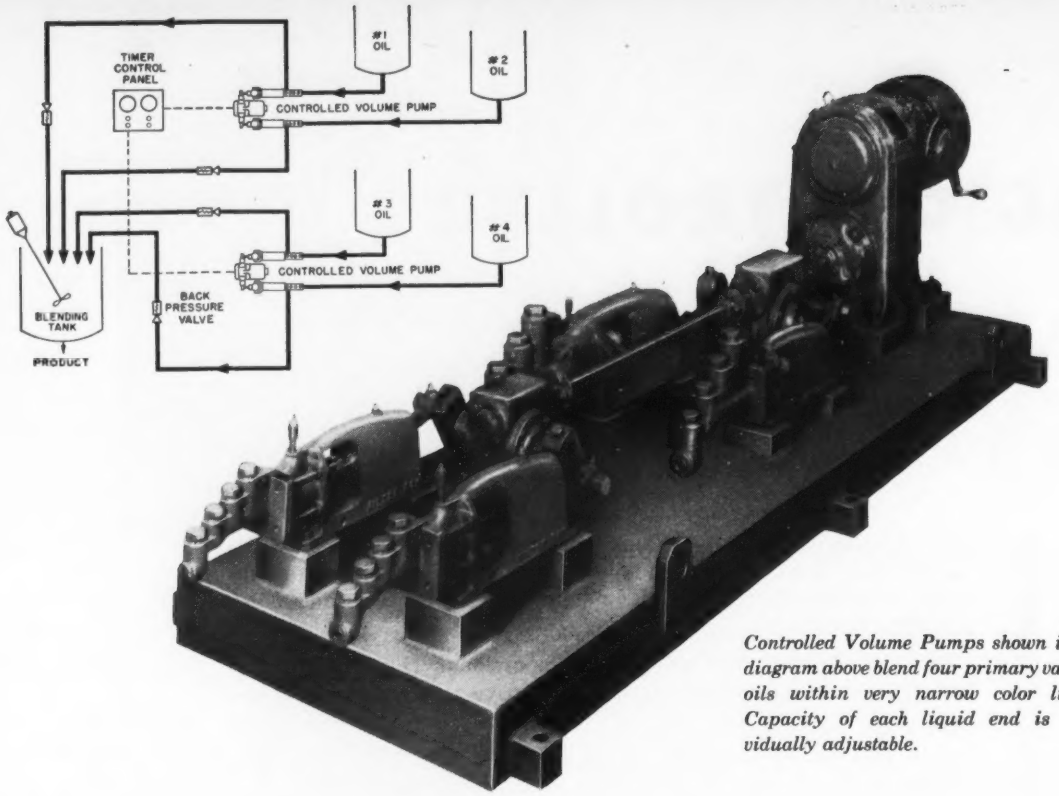
Reset

Addition of reset, derivative, pneumatic set, differential or time schedule functions by means of standard interchangeable subassemblies.



Wide selection of primary elements to suit process requirements — helical or spiral coils; bellows; diaphragm; or mechanical connection such as flow meter shaft.

For more information on product at left, specify 4701 see information request blank opposite last page.



Controlled Volume Pumps shown in the diagram above blend four primary varnish oils within very narrow color limits. Capacity of each liquid end is individually adjustable.

Controlled Volume Pumps ratio and blend chemicals exactly... easily... economically

You can be sure of end-product uniformity when you formulate chemicals with Controlled Volume Pumps.

These positive-displacement pumps continuously maintain fixed ratios among all ingredients in a mix. They meter as they pump with an accuracy within ±1%. A single pump can have from three to ten liquid ends.

On the pump shown above, for example, one variable speed motor drives four liquid ends. Capacities differ for all four liquid ends, yet fixed ratios can be established among all capacities. An increase in motor speed produces a corresponding increase in the quantity of chemical metered by each liquid end. The exact ratios of each chemical to another remain constant. Basic ratios can be changed by manual adjustment of stroke lengths on any or all four pumping units.

With capacities ranging to 1350 gallons per hour per liquid end, Milton Roy Controlled Volume Pumps are applicable to both pilot plant and production use. Write for Bulletin 1253, "Controlled Volume Pumps in Process Instrumentation."

MILTON ROY COMPANY, *Manufacturing Engineers*, 1300 East Mermaid Lane, Philadelphia 18, Pa.

milton Roy
CHEMICAL FEED SYSTEMS

Engineering Representatives in the United States, Canada, Mexico, Europe, Asia, South America, Africa and Australia.

When inquiring check 4702 opposite last page

Measures flow rates up to 75,000 cfh of air

'Simple-to-install flowmeter for gases is easy to clean

Uses: Measuring flow rates of air and gases, separately or in mixtures. Units are especially useful where flow rate measurements are required at numerous points.

Features: Designed for panel or "in line" mounting, flowmeters are simple and economical to install. Simplified construction also permits easy cleaning and low maintenance costs. Units will handle up to 75,000 cfh of air.

Description: Gas or air entering bottom of tapered vertical measuring tube passes up around metering float and through top outlet. The stream lifts float assembly to which is attached the indicating disc, visible in oil-filled sight glass (oil damps "fluttering" due to small pressure fluctuations). Annular orifice is so designed as to maintain constant pressure drop in unit regardless of change in flow rate. Every flowmeter is individually calibrated for specified flow conditions.

(Flo-Scope flowmeters are manufactured by Selas Corporation of America, Dept. CP, Dresher, Pa. . . . or for more information check 4703 on form opposite last page.)

Data system reliability

Manufacturer offers reprint of four pages on reliability of industrial data systems. Paper traces development of industrial data system and forecasts its role in future development of closed-loop automation systems. "Increasing Reliability of Industrial Data Systems," R-98 — Beckman Instruments, Inc., Dept. CP, 2500 Fullerton Rd., Fullerton, Calif. Check 4704.

SR-4® LOAD CELLS OFFER YOU NEW ACCURACY—EASE—ECONOMY IN ALL INDUSTRIAL WEIGHING AND PROCESSING

Baldwin SR-4 Load Cells end the costly task of moving loads to and from a weighing unit. Now weigh right in process! Compact Baldwin transducers will measure any tension or compression force—shaft or jet engine thrust—cable tension; determine center of gravity, weight and balance. The applications are virtually unlimited. Weigh loads at rest or in motion. Measurements are accurate to better than $\pm 1/4\%$; repeatability is better than $\pm 1/10\%$.

Standard Baldwin SR-4 Load Cells range in capacity from 50 to 200,000 lb. The varying electrical signal from the SR-4 Bonded Wire Strain Gage, basic component of the load cell, can be fed to a wide variety of Baldwin recording or computing equipment.

Whatever your weighing problem, a B-L-H representative can help you. For more information, write today for your free copy of Bulletin 4301 on SR-4 Load Cells.

BALDWIN · LIMA · HAMILTON

Electronics & Instrumentation Division

Waltham, Mass.

SR-4® strain gages • Transducers • Testing machines

For more information on product at right, specify 4705 see information request blank opposite last page.

3 WAYS TO MEASURE TEMPERATURE

bi-metal

THERMOMETERS

for industrial and "built-in" needs

Overwhelmingly preferred because of their all-metal ruggedness, stability and long life. In heavy duty types, straight and angle forms, 6" and 5" dia heads — industrial types, angle form, 3" and 2" heads; stainless steel stems, lengths from 2½" to 24". Ranges low as −100 F to high as 1000 F; accuracy 1% of range.

filled system

THERMOMETERS

for remote readings—alarms

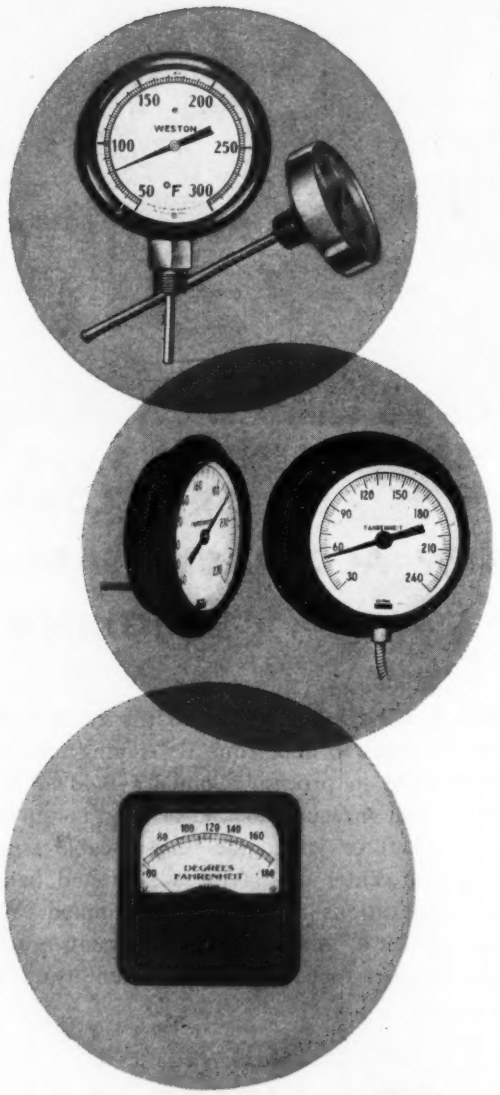
Available with mercury, liquid, gas filled, or vapor pressure actuations in 5", 6" and 8" dial sizes — for wall or flush mounting. Models to indicate as low as −325 F or as high as 1000 F. Available with adjustable electrical contact and index pointer for signal or alarm needs.

electrical resistance

THERMOMETERS

for remote and multiple readings

Resistor bulb permits remote temperature readings — and by use of several bulbs, several different remote temperature measurements can be made using a selector switch. Accuracy 1% of full scale. Ranges low as −100 to high as 500 F.



For literature write . . . Weston Electrical Instrument Corp., Newark 12, N. J.

WESTON THERMOMETERS

When inquiring check 4706 opposite last page

Less panel space needed by small pyrometers

Printed circuits, miniature tubes cut size 50 percent

Uses: Although primarily for temperature control, millivoltmeter pyrometers can also be used to measure other process variables as speed, vacuum, density, and electrical quantities.

Features: Small pyrometers uses high-strength magnet material, printed circuits, miniature tubes and relays to save approximately 50 percent of panel space now required.

Description: Pyrometer controller is self-contained instrument with plug-in control unit. Electrical connections can be made from all sides of instrument — front and rear, top, or sides. Range changes can be made in the field. Accuracy is ±0.5 percent instrument span. Controller sensitivity is less than 0.1 percent. Manual adjustment permits a decrease in sensitivity to 0.5 percent of full scale.

Series of pyrometers includes two-position controller, three-position dual-index controller, three-position single-index controller, and others. Control forms are interchangeable and can be varied to solve specific control problems.

(HP-30 pyrometer series is product of General Electric Company, Dept. CP, Schenectady 5, New York. Check 4707 opposite last page.)

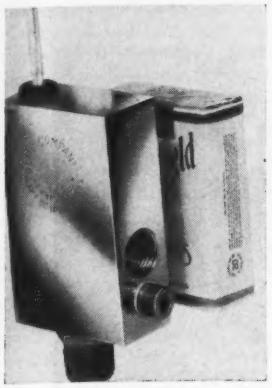
Detects low rate of flow and actuates devices for control

Rate can be as low as one gallon per hour

Uses: As flow detector for operation of remotely-located control and alarm devices — according to flow or lack of it.

Features: Flow detector operates reliably at rates of flow as small as one gallon per hour.

Description: Instrument has only one moving part, a mag-



Size of flow detector is suggested by package of cigarettes

netic switch unit. Magnetic snap action operates on a pressure differential of less than ½ psi. External adjustment on standard models allows operation at preset rate of flow from 5 to 50 gpm. Higher or lower adjustment ranges can be provided. Standard casting bodies are brass but can be furnished in nonmagnetic marine bronze aluminum, stainless steel, plastic, or other materials to suit individual installation requirements.

(Model F1-900 Flow Indicator is product of The Gems Company, Dept. CP, Newington, Conn. . . . or for more information check 4708 on the convenient Reader Service slip opposite last page.)

"How's it coming? . . ."

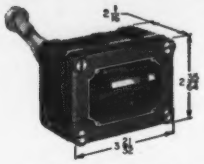
MICRO SWITCH . . . FIRST IN PRECISION SWITCHING

MICRO SWITCH Splash-Proof Switches give you precision, snap-action switching under extreme moisture conditions

Four basic actuator designs—wide variety of operating characteristics and electrical ratings. Available in both single-pole double-throw and double-pole double-throw contact arrangements.

Technical advice on applications for MICRO SWITCH precision switches is available at all branch offices. Stocks of switches are carried by distributors in all key cities. Look under "Switches, Electric" in the Yellow Pages.

Send for Catalog 83 for information on the full line of enclosed switches

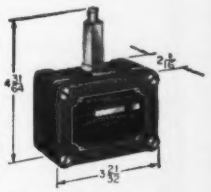


Type OP Switch with roller-arm actuator

This model is designed for operation by cams or slides. A seal on the shaft prevents liquid splash from entering through the actuator. The arm is field adjustable through 360°, allowing 90° overtravel in any position.

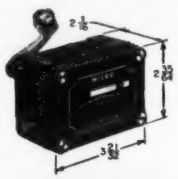
Characteristics of single-pole double-throw switch are: Operating force—½ to 1¼ lb.; Release force—¼ lb. min.; Pretravel—7/32 in. max. (8°); Overtravel—90° max.; Differential travel—.007 in. max. (¼°).

Type OP Switch with plunger actuator



This switch has a radius-tipped overtravel plunger. A stop ring near the tip permits a steady load of one hundred pounds on the plunger without injury to the enclosed switching unit.

Characteristics of a single-pole double-throw switch are: Operating force—3 lbs. max.; Release force—¾ lb. min.; Pretravel—5/64 in. max.; Overtravel—3/16 in. min. Differential travel—.004 in. max.

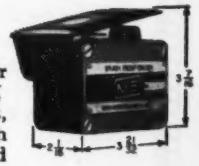


Type OP Switch with cross roller-lever actuator

This switch is designed for operation by cams or slides whose approach is from an angle perpendicular to the longitudinal axis of the switch. The arm is adjustable through 360°.

Characteristics of a single-pole double-throw switch are: Operating force—8 to 20 oz.; Release force—4 oz. min.; Pretravel—7/32 in. max. (8°); Overtravel—90° max.; Differential travel—.007 in. max. (¼°).

Type OP Switch with paddle-shaped actuator



This switch is widely used as a manual control for power equipment. The actuator provides 11¼ square inches of actuating surface, permitting fast, safe manual operation. A rubber bumper beneath the free end of the actuator protects the enclosed switching unit from shock.

Characteristics of a single-pole double-throw switch are: Operating force—2¼ lbs. approx.

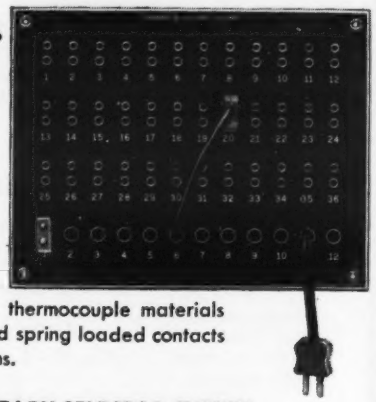
MICRO SWITCH
A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY
In Canada, Leaside, Toronto 17, Ontario • FREEPORT, ILLINOIS

When inquiring check 4709 opposite last page

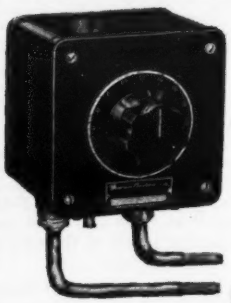
SWITCHING MANY THERMOCOUPLE OR RESISTANCE BULB CIRCUITS?

Temperature measuring applications are like tracks in a freight yard—they often need plenty of quick switching. Achieving both measuring accuracy and speed — especially with frequent switching — requires a system well suited to the individual circuit. Among Thermo Electric's four methods is one best suited to *your* needs.

QUICK-COUPLING CONNECTOR PANELS



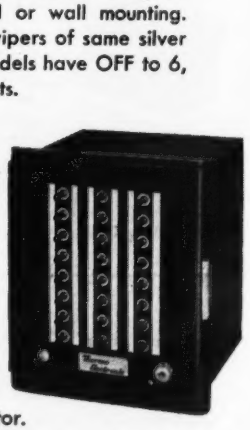
Provide great flexibility for transferring numerous thermocouples—ideal for patch panel use. Many compact shapes and sizes. Panel for 48 thermocouples and 16 pyrometers measures only 13¼ x 7⅞". Polarized plugs and jacks of standard thermocouple materials have long-wiping surfaces and spring loaded contacts for good electrical connections.



ROTARY SELECTOR SWITCH

For quick checking or switching of thermocouples or resistance bulbs. "Shorting-type" switches designed for flush panel or wall mounting. Contacts and wipers of same silver alloy. Three models have OFF to 6, 12 and 24 points.

KEY SWITCHES



Provide a choice of connecting many sensing elements to one instrument or transferring sensing elements from one type of instrument to another. Locking or non-locking construction.

PUSH-BUTTON SWITCHES

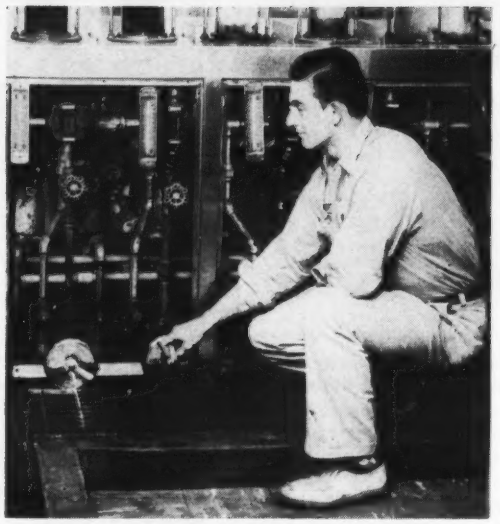
For on-off checking of temperatures from many points or averaging any number of temperatures on one indicator.

Single Case Construction | 12-72 points for push buttons, 12-144 for keys.

Write for Bulletins | Connector Panels No. 23-R
Rotary Switches No. 24-100-R
Key and Push-Button Switches No. 24-1-R

Thermo Electric Co., Inc.
SADDLE BROOK, NEW JERSEY
In Canada — THERMO ELECTRIC (Canada) Ltd., Brampton, Ontario

When inquiring check 4710 opposite last page



Operator setting thermostatic control on waterline for test run

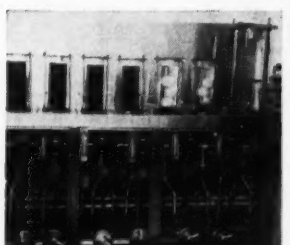
Thermostatic water control solves testing problem

Nalco builds test rack for simple yet effective control of solubility standards

Problem: For accurate testing of briquette solubility, National Aluminate Corporation requires that water test temperatures not vary more than ±2° at 60°F. Main use of briquettes is for control of scale, corrosion, and microorganisms in boiler feedwater and other industrial water systems. Solubility standards for each of more than 50 different formulas must be rigidly maintained. If solubility is too high, treating chemicals will be wasted. If solubility is too low, sufficient protection is not secured.

Solution: Nalco installed a test rack made to its own specifications to maintain uniform test water temperatures. Rack consists of eight individual glass water chambers in which briquettes are placed. Each chamber has its own water supply, drain, flow meter, thermostatic mixer, and thermometer.

To maintain solubility standards, Nalco tests each production run by subjecting samples to solubility test. Briquettes are placed in water flowing at rate of 1 gpm for four hours. They are then weighed to determine loss, which may range from 30 to 90 percent, depending on formula. Briquettes are direct-treatment formulations for specific prob-



Portion of test rack

lems and conditions.

Cause of uniform test conditions is thermostatic water mixer which maintains a constant temperature regardless of changing supply pressures or temperatures. Temperature controller has a range of 65° to 110°F. If failure of either hot or cold water supply occurs, flow stops.

Results: Nalco has been using the testing rack with automatic control for approximately two years. Company considers that use of test rack provides simple yet effective solution to problem of testing. Easy adjustment allows "custom" conditions to be duplicated without difficulty.

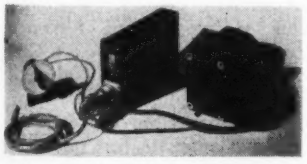
(Type H. Hydroguards are product of The Powers Regulator Company, Dept. CP, 3434 Oakton St., Skokie, Ill. Check 4711 opposite last page.)

Remote positioner has high torque, fast response

Reaches maximum speed in one-fiftieth second

Uses: For remote control of small valves where split-second response and high torque are necessary.

Features: Remote positioner system reaches maximum speed in one-fiftieth second



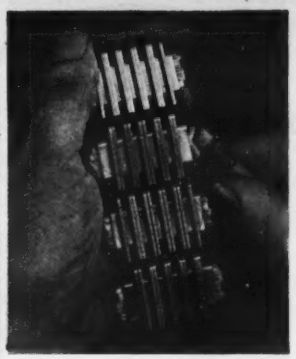
Remote positioner system has fast response

and is accurate within ½ of one degree.

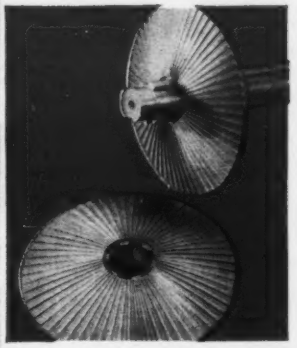
Description: Originally developed for aircraft applications, positioner system has been adapted for industrial use. Operation is on 60-cycle power.

(Electrolink is product of Grand Rapids Division, Lear, Inc., Dept. CP, Grand Rapids 2, Mich. Check 4712 opposite last page.)

INSTANT SPEED CHANGING. To get desired output rpm, operator simply turns handwheel to desired position on easy-to-read dial. P.I.V. responds instantly, accurately. Drives are also available with automatic, electric, pneumatic or hydraulic controls.



SELF TOOTH-FORMING CHAIN consists of a series of steel laminations, serving as teeth, which are free to move from side to side, either singly or collectively.



RADIALLY GROOVED WHEELS have teeth cut at constant depth but of increasing width toward wheel periphery. Beveled sides of teeth provide gripping surfaces for chain.

Slipless transmission - - stepless selection

That's because LINK-BELT P.I.V. uses self-tooth-forming chain

LINK-BELT P.I.V.—unlike other variable speed drives—incorporates an exclusive metal, self-tooth-forming chain to give you instant, positive speed variation, regardless of load. This unique drive permits infinitely variable speed changes without loss of accuracy or interruption of operations. That's why P.I.V. is all industry's choice for jobs requiring stepless, slipless power transmission.

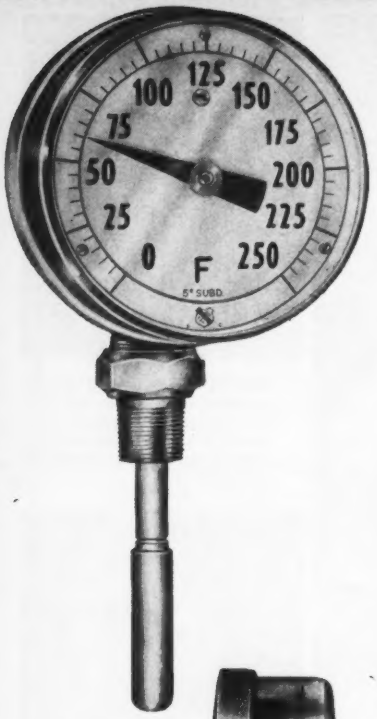
Changing speed is simple too. A turn of the control screw simultaneously varies the effective diameters of two sets of conically shaped wheels—closing one set, spreading the other. At the same time, the self tooth-forming chain automatically adjusts to provide desired ratio between the input and output shafts.

Link-Belt P.I.V. drives are fully enclosed for trouble-free operation. They're splash-lubricated for long life—unaffected by atmospheric conditions. Choose from 8 sizes in 16 standard types, with the aid of Book 2274. Call your nearby Link-Belt office or authorized stock-carrying distributor for complete information. 14.314

LINK-BELT P.I.V. VARIABLE SPEED DRIVE

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World.

When inquiring check 4713 opposite last page



NEW

MERCURY ACTUATION

IN A MODERN 'AMERICAN' "Every Angle" DIAL THERMOMETER

If you expect the most for your money in readability, accuracy and durability, here is the best dial thermometer investment you can make. The 'American' Mercury-Actuated "Every Angle" Dial Thermometer provides a combination of five major advantages found in no other thermometer:

"Every Angle" Set-ability. You can turn the dial to any angle within 180° on two axes. Whether installed above or below eye level – to the right or left of the reading point – you get easy face-to-face readings.

Fast, Accurate Indication. Mercury – one of the most sensitive heat transfer mediums – makes possible readings up to 1000° F. in a few moments with accuracy within 1% of the entire scale range.

Surest, Sharpest, Easiest Readings. The Maxivision® dial – a split-level dial – is constructed so that the graduations and pointer are on the same plane. No perspective effect. No parallax error in reading.

Best in Visibility. The cover is a large, durable, clear glass dome without bezel. No dark shadows dim the dial to hinder reading accuracy.

Stainless Steel Construction. Movement, capillary tubing, stem, case and cover mounting – all are stainless steel.

Where resistance to corrosion is important, where appearance and cleanliness are essential, the 'American' Mercury-Actuated "Every Angle" Dial Thermometer is ideal. It is rugged – has every quality required for the toughest services, indoors and outdoors. From the standpoint of economy, the "Every Angle" feature alone can save money in new piping specifications and when changing existing piping. It reduces the need to re-specify and stock a variety of fixed stem thermometers.

Dial Size: 4½". *Temperature Ranges:* –20/120° F. to 200/1000° F. *Stem Lengths:* 4", 6", 8", 12", 18" and 24". Separable sockets available.

YOUR INDUSTRIAL SUPPLY DISTRIBUTOR has complete information on the 'American' Mercury-Actuated "Every Angle" Dial Thermometer. Call on him to fulfill your requirements with fast delivery from local stocks.

AMERICAN INDUSTRIAL INSTRUMENTS

A product of **MANNING, MAXWELL & MOORE, INC.** STRATFORD, CONN.

In Canada: *Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario*

MAKERS OF 'AMERICAN' INDUSTRIAL INSTRUMENTS, 'ASHCROFT' GAUGES, 'CONSOLIDATED' SAFETY VALVES, 'AMERICAN-MICROSEN' INDUSTRIAL ELECTRONIC INSTRUMENTS, *Stratford, Conn.* 'HANCOCK' VALVES, *Watertown, Mass.* 'CONSOLIDATED' SAFETY RELIEF VALVES, *Tulsa, Okla.* AIRCRAFT CONTROL PRODUCTS, *Danbury, Conn., and Inglewood, Calif.* "SHAW-BOX" AND 'LOAD LIFTER' CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES, *Muskegon, Mich.*

When inquiring check 4714 opposite last page

Plots refractive data on gas streams or liquids

Automatic process refractometer for rapid analysis

Uses: As process controller for rapid analysis of non-opaque liquid and gas streams. Can be used for controlling blending of two streams, identifying compounds, measuring concentrations of gases and solids in solutions.

Features: Process refractometer automatically plots refractive index changes. Instrument has fail-safe operation which actuates an alarm.

Process refractometer

Description: Instrument is process model of manufacturer's differential refractometer. Designed for minimum installation and maintenance costs, instrument is supplied as one unit with differential refractometer mounted inside cabinet. Removable covers and access doors are provided for easy maintenance. Instrument can be supplied to meet Class 1 Group D requirements for hazardous locations. It is of the null type, and is designed for continuous operation on 115v AC single phase 60 cycle. No batteries are required.

(Automatic process refractometer is product of Phoenix Precision Instrument Co., Dept. CP, 3803-05 N. 5th St., Philadelphia 40, Pa. . . . or for more information check 4715 on form opposite last page.)

Automatic control features

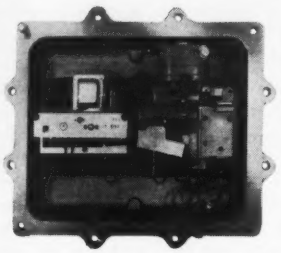
Over 100 items are listed in 56-page catalog on automatic controls. Featuring hermetically-sealed mercury contacts, controls for pressure, temperature, liquid level, and mechanical movement are treated. Cat 857 — The Mercoid Corp., Dept. CP, 4201 Belmont Ave., Chicago 41, Ill. Check 4716.

Level control system for hazardous locations

System converts level into proportional output

Uses: As level controller for both liquids and solids. Can be used with water, alkalis, oils, acids, aqueous solutions, or granular solids.

Features: Designed to utilize advantages of electronics and pneumatics, level control system has been developed for use in hazardous locations. Explosion-proof model is available.



Level control with cover removed

Description: Controller is capacitance-actuated. Small changes in level are converted into a proportional air output. Instrument is intended for use in Class 1, Group C and D, and Class 11, Group E, F, and G locations. Detecting probes are rigid rod-shaped structures without moving parts. Systems can have either of two pneumatic actions: increase in air output with increase in measured level, or decrease in air output with increase in measured level.

Complete system consists of detecting probe, control component, together with sources for 115 volts and 18 psi input pressure. Control component includes an oscillator unit, electro-magnetic relay, nozzle and flapper assembly, pilot relay valve, rebalance bellows and capacitor.

(Models 111 and 112 pneumatic level controllers are product of Fielden Instrument Division, Robertshaw-Fulton Controls Company, Dept. CP, 2920 North 4th Street, Philadelphia 33, Pa. Check 4717 on form opposite last page.)

FREE

FREE BOOKLET answers your basic questions about instrumentation tape!

Get all the latest information about America's most dependable, most complete line of instrumentation tapes! Error-free tapes! Minnesota Mining and Manufacturing Company wants to mail you its new, illustrated instrumentation tape brochure. In this reference book you'll find technical specs and analyses on tapes for industry and defense . . . answers to questions, suggestions on instrumentation applications. Mail the coupon for your free copy now.

- How to solve rub-off problems
- What tape to use for high, medium, low speeds, pressures and temperatures
- What tape to use for long or short wave length recording

SCOTCH BRAND Magnetic Tapes

INSTRUMENTATION DIVISION

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FILL OUT AND MAIL

Minnesota Mining & Mfg. Co.
Dept. PP-77, St. Paul 6, Minnesota

Send me the 3M Instrumentation booklet at once.

NAME_____

POSITION_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE___ STATE_____

When inquiring check 4718 opposite last page

Would you like to receive CHEMICAL PROCESSING personally?

It will be sent to you without charge or obligation . . .

. . . if you qualify

. . . if you request it

If you are responsible for processing operations in an administrative capacity as plant superintendent, chemical engineer, chemist, engineer or equivalent responsibility . . . in a plant of substantial operations* where chemical processing is an important factor . . . CHEMICAL PROCESSING will be sent to you without charge or obligation if you request it. Use form below. In requesting, be sure to answer all questions. If your firm is not rated or listed in standard references, indicate size of the company by capacity, annual sales or number of employees. Unless all information is given, magazine will not be sent.

***"Substantial operations" does not necessarily mean an extremely large plant. But requests for the magazine exceed supply so we must set standards to insure publication being sent where it can be used to best advantage.**

CHEMICAL PROCESSING
111 EAST DELAWARE PLACE
CHICAGO 11, ILLINOIS

Please send me CHEMICAL PROCESSING without charge or obligation

Name _____

Title _____

Company _____

Rating of Company _____

Street _____

City _____ Zone _____

State _____

Main Products _____

Reads specific gravity directly without need for charts

Has zero-set, temperature calibration adjustments

Uses: For direct-reading specific gravity of fluids under maximum conditions of 125 psi and 220°C.

Features: Instrument has zero-set adjustments for original calibration under working conditions, and temperature adjustment for setting to existing fluid temperature.

Description: Adjustable-scale instrument has a body of Pyrex-brand glass pipe with trim of 316 stainless steel. Plummet is also of Pyrex with a calibrating chain of platinum or tantalum. Liquid can be passed continuously through instrument.

(Adjustable-scale specific gravity indicator is product of Precision Thermometer & Instrument Co., Dept. CP, 1434 Brandywine St., Philadelphia 30, Pa. . . . or for more information check 4719 on form opposite last page.)

Easy expandability is designed into control system

Is non-electronic, handles any number of variables

Uses: As electro-mechanical control system for measurement, indication, transmission, and control of process variables: pressure, flow, liquid level, temperature.

Features: Easy expandability is designed into control system. Long operational life is provided by electro-magnetic transducers and magnetic amplifiers.

Description: Control system has three basic components: signal transmitter (transducer), power unit (magnetic servo amplifier), and a null-balance indicating receiver. Conventional indicators, recorders, and controllers can be used with signal transmitter. AC Wheatstone bridge recorders can be used directly with

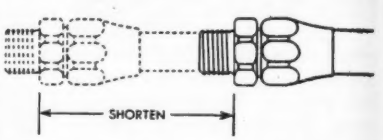
Aeroquip Engineering Notes

B. A. MAIN, JR.

The advertisement at the right says you can save money if you buy Aeroquip Hose Lines. Let's see how right this statement is.

Consider the production line along which a product using hose of Teflon is assembled. Your purchasing department will buy anywhere from three to six months' supply of hose lines to feed the production line. In this day and age of rapid change, it is pretty much a foregone conclusion that some engineering revision or modification will be required on the product.

Where these changes affect the hose lines, if you purchased Aeroquip Hose Lines originally, the detachable, reusable hose fittings always used by Aeroquip make it possible to rework the hose lines. Should the hose lines need to be shortened, it is simple to remove one of the hose fittings, cut the hose to the proper length and re-assemble. If the hose



line needs to be longer, a new piece of hose can be installed easily, using the same fittings over again. This can be done in your plant by your own people, or if our costs are lower —as they might be if the quantity of lines to be reworked is large—you can have them reworked by us.

The advertisement shows the proportion of cost of a hose fitting to the cost of the hose assembly. This proportion varies with the complexity required in the hose fitting. A fitting composed of complicated bends of rigid tubing, with perhaps one or two bosses welded into it, may run several times the cost of the hose itself. In any case, simple or complicated, the cost of the fittings will usually exceed the cost of the hose.

If you purchase hose lines with permanently attached hose fittings, no rework is possible and you must pay at least double for the privilege of making an engineering change. If you purchase Aeroquip 2802 Hose Lines made of Teflon you can, as the ad says, save money—often more than half of what new hose lines would cost you. And, you can buy the Aeroquip Hose Line with its Detachable, Reusable ***"super gem"*** Hose Fittings at prices competitive with the price you pay for hose lines made of Teflon with permanently affixed hose fittings.

B. A. Main Jr.

VICE PRESIDENT, ENGINEERING
AEROQUIP CORPORATION

Hose assembly pictured has male pipe and JIC swivel fittings for industrial applications. Aircraft hose lines use more complicated fittings that represent a much higher percentage of the total hose line cost.

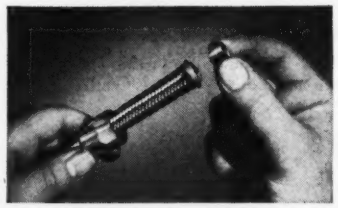
Aeroquip 2802 Hose Lines (Teflon*) Cost Less

BECAUSE "*super gem*" FITTINGS ARE REUSABLE

Hose lines made of Teflon excel where applications require lubricity, non-adhesion of sticky or viscous materials, resistance to temperatures up to 500° F., chemical inertness and extra long wear. Admittedly, these hose lines are expensive, but their true cost cannot be determined by purchase price alone. Hose lines of Teflon with permanent-type, swaged-on fittings are priced competitively with Aeroquip 2802 Hose Lines (Teflon), but Aeroquip "*super gem*" Fittings are reusable and can be salvaged. And the fittings are the most expensive part of any hose line!

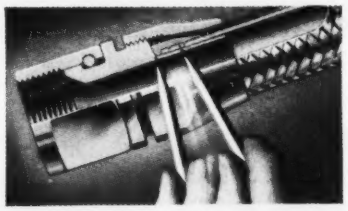
Because it had purchased a "production quantity" of hose lines made of Teflon with permanently attached fittings, one company was forced to scrap more than $100,000 worth of hose lines due to a single engineering change. With Aeroquip 2802 Hose Lines, the "*super gem*" Fittings could have been salvaged and reused with savings of thousands of dollars.

Not only do "*super gem*" Fittings give Aeroquip 2802 Hose Lines cost-cutting advantages, they assure the ONLY leakproof, ageless assembly of fitting and hose of Teflon. Want more information? Mail this coupon:



Aeroquip 2802 Hose (Teflon) and "*super gem*" Fittings can be assembled by hand in a few minutes. No expensive swaging machine is needed. A wrench and vise do a perfect job.

"*super gem*" is an Aeroquip Trademark.



Cutaway of "*super gem*" Fitting with metal-to-metal line seal pointed out at left and lip seal at right. Together, these features assure permanent protection against leakage.

*DuPont trade name for its Tetrafluoroethylene resin.

Aeroquip Corporation,
Jackson, Michigan

Please send me the following information on reusable "*super gem*" Fittings and Hose made of Teflon:

- ☐ Industrial Engineering Bulletin IEB-26A.
- ☐ Aircraft Engineering Bulletin AEB-13.

Name_____

Title_____

Company_____

Address_____

City_____ Zone_____ State_____

Aeroquip

REG. TRADEMARK

AEROQUIP CORPORATION, JACKSON, MICHIGAN

INDUSTRIAL DIVISION, VAN WERT, OHIO; WESTERN DIVISION, BURBANK, CALIF.;
MARMAN DIVISION, LOS ANGELES, CALIF.; GENERAL LOGISTICS, PASADENA, CALIF.; AEROQUIP (CANADA) LTD., TORONTO 10, ONTARIO.

When inquiring check 4720 opposite last page

transmitters with some modification.

In measuring pressure, differential pressure, or flow, system operates with twisted Bourdon tube or bellows. Process variable is converted into shaft rotation of rotary differential transformer. Output from unit is AC voltage proportional to variable. Magnetic servo amplifier compares AC signal voltage with second voltage which serves as control. Difference between two voltages indicates magnitude of variable.

Since mechanical coupling within unit can be linear or non-linear, non-linear variable can be indicated on linear scale.

When measuring temperature, system uses temperature-sensitive resistor and precision potentiometer.

Remote transmission is possible. Any basic system can be expanded by addition of auxiliary functions as: adjustable alarm signals, off-on control, digital encoding, retransmission into other systems.

(ElectroSyn system is product of Norwood Controls, Unit of Detroit Controls Corporation, Dept. CP, 934 Washington Street, Norwood, Massachusetts . . . or for more information about manufacturer's product reader may simply check 4721 opposite last page.)

Look for it! . . .

THE AUTOMATED PLANT — A SEPTEMBER HIGHLIGHT

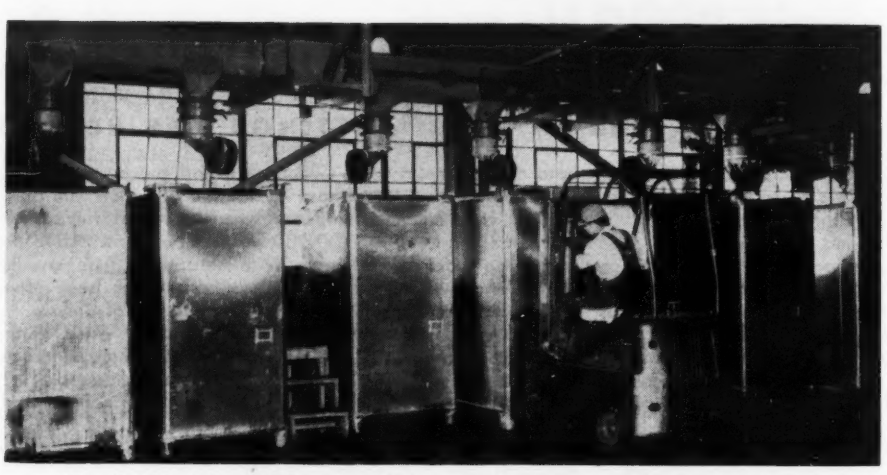
We're now planning our September Instrumentation feature. One of the highlights will be a report on a spontaneous panel discussion about the automated chemical processing plant . . . by more than twenty top men making and using instruments. Don't miss this exclusive in the September Instrumentation feature!

In manufacture of rubber, different types of carbon black have to be handled in large quantities each day. Goodyear of Kansas was receiving and handling carbon black in 50-lb bags — an unsatisfactory method, but necessary for required flexibility. However, Goodyear got the desired flexibility in a bulk-handling system where 165 mobile . . .

bins handle 140,000 lb carbon black a day and meet changing process requirements

. . . results are bulk discounts, improved handling procedures, and reduced need for housekeeping

Conveyor feeds material from rail car to bin loading station. Thirteen bins hold 26,000 lb



When first bin in line is full, carbon black is carried over into second bin and so down the line. Full bins are removed by lift truck and replaced with an empty

Problem: Goodyear Tire and Rubber Co., of Kansas, had a problem that could be solved by installing large silos and mechanical conveying equipment. But they wanted to avoid high capital investment if possible.

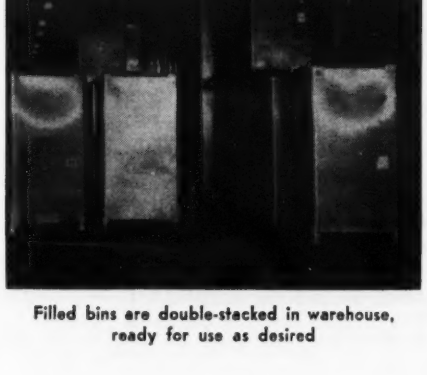
The situation was this: Manufacture of rubber calls for large quantities of carbon black, and Goodyear's Topeka, Kansas plant uses about 140,000 lb per day. Because of ever-changing processing requirements, and the fact that six different carbon blacks are being handled, flexibility is of utmost importance.

Goodyear was receiving and handling carbon black from delivery to points of processing in 50-lb bags. Handling such large amounts in bags was not a satisfactory method, even though it gave them flexibility.

Solution: After careful investigation, Goodyear decided to use a system of mobile bulk-storage bins, which they were able to tie in with existing handling equipment. The system has enabled them to receive carbon black in bulk rather than in bags.

Carbon black arrives at plant in rail cars and is discharged at outdoor unloading station. Screw conveyors feed it first to bucket elevator and then to another conveyor that runs into building.

Here it is fed into 92-cu-ft mobile storage bins, whose overall height is 7′ A multiple filling station is able to handle 13 bins holding a total of 26,000 lb. Carbon black drops from conveyor into en-



Filled bins are double-stacked in warehouse, ready for use as desired

Discharge stations have arrangement which tilts bins 45° to discharge carbon black by gravity onto conveyors. Conveyors carry the material to processing sections

try port in top of each bin. A flexible connection fits tight to bin's top and is attached to spout in bottom of conveyor by means of nylon "sock".

When first bin in line is full, carbon black is carried over the second bin and so on down the line until one compartment of a car has been unloaded. Lift truck then removes loaded bins and replaces them with empties.

After filling, bins are stacked in warehouse. As needed, they are carried by fork-lift truck to discharge stations, where the black is fed by conveyors into scale hoppers over the mixers.

These stations convert the bins into discharge hoppers by tilting them 45°. In this position, a hinged door at front of bin opens, permitting carbon black to flow out by gravity through opening in discharge mechanism. From here, conveyors take the black to processing areas.

Results: Goodyear now has a flexible system that is adaptable to any future process changes. In addition, initial cost was much less than conventional large silos and conveying equipment. Now, handling and storage operations are virtually dustless — giving much improved housekeeping over that needed when handling bags.

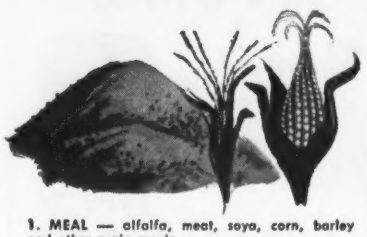
There have been savings in the cost of the carbon black by changing from bag to bulk lots.

(Tote Bins and Tilt unloading systems are products of Tote Systems, Inc., Dept. CP, Beatrice, Neb. . . . or for more information check 4722 on form opposite last page.)

Flat wire-belt conveyor

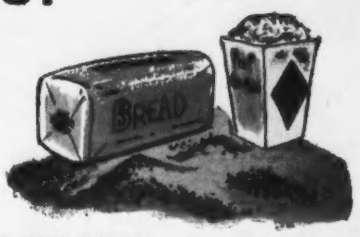
Bulletin of two pages describes and illustrates flat wire-belt conveyor and sprockets. Specifications, dimensions, and features are covered. Drawings show details of sprocket. Bul on flat-wire-belt conveyor — Cyclone Fence Dept., American Steel & Wire Div., United States Steel Corp., Dept. CP, Waukegan, Ill. Check 4723.

Q. What's the best way to store and handle these bulk materials?

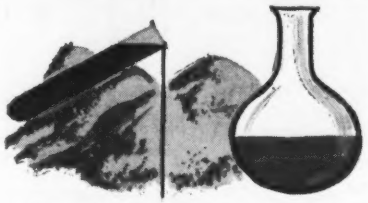


1. MEAL — alfalfa, meat, soya, corn, barley and other grain meals.

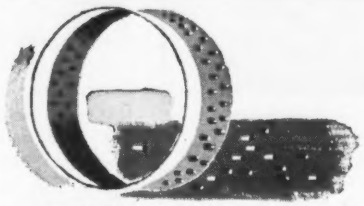
2. WOOD PRODUCTS — chips, flour, sawdust, shavings and cork.



3. EDIBLE PRODUCTS — flour, sugar, starch, malted milk powder, malted barley, dried milk, popcorn and other whole grains.



4. CHEMICAL COMPOUNDS — insecticide powders, pharmaceuticals, urea, ground rubber, clays.



5. PELLETIZED MATERIALS — alfalfa, urea, oil meals, nitrates and other chemicals.

ILLUSTRATED HERE are a few of the many bulk materials that can be stored and handled by Permaglas Storage Units. Variety of products and industries served is practically unlimited. If you have a storage and handling problem, we will be glad to discuss its solution with you.

A. Mechanize the job completely with A. O. Smith Permaglas® Storage Units

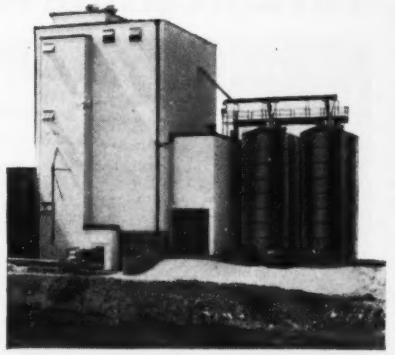
WHATEVER your bulk materials storage and handling problems, it will pay you to investigate A. O. Smith Permaglas Storage Units. A modern materials handling system incorporating these units lets you *store more in less space . . . at lower cost.*

● **Greater overall efficiency** — Incoming materials are conveyed directly into the Permaglas Storage Unit. Exclusive sweep-arm bottom unloader automatically discharges bulk materials into your apportioning system — by the batch or in continuous process.

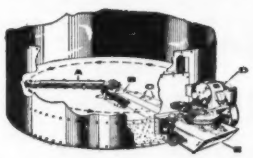
● **Reduced materials handling costs** — Permaglas Storage Unit is designed for maximum filling. Permits economical bulk-lot materials purchasing. Eliminates costly man-handling of incoming packages as well as in-plant trucking.

● **Maximum use of space** — Variety of heights and diameters available in Permaglas Storage Units assures maximum use of storage space in existing locations or new facilities.

● **Minimum maintenance costs** — Permaglas Storage Units are glass-protected steel, inside and out. No internal corrosion from stored materials. No expensive exterior maintenance as with conventional structures.



The Permaglas Storage Unit installation, with mechanized sweep-arm bottom unloaders, is the heart of this modern bulk materials handling system.



OPERATING PRINCIPLE OF A. O. SMITH SWEEP-ARM BOTTOM UNLOADER. As unloading arm (A) moves counter-clockwise, endless chain on arm moves the material to the center where it drops into sub-floor conveyor trough (B) for removal at discharge opening (E). Two steel plates (C) cover chain conveyor. Entire mechanism is powered by electric motor (D).

Through research . . . a better way

A.O.Smith
CORPORATION

HARVESTORE PRODUCTS
Kankakee, Illinois
Distributor: SPROUT-WALDRON
Muncy, Pennsylvania

Mail coupon for 6-page bulletin on Permaglas Storage Units with mechanized bottom unloader.

A. O. SMITH CORPORATION
Harvestore Products, Kankakee, Ill., Dept. CP-757

Please send me more information and data about Permaglas Mechanized Storage Units.

Name.....
Firm.....
Address.....
City.....Zone.....State.....

MU-2333

When inquiring check 4724 opposite last page

HERE'S HELP

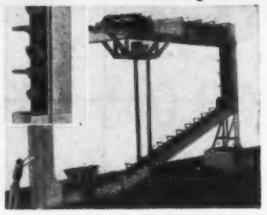
THAT SOLVES TROUBLESOME BULK HANDLING PROBLEMS:

Hapman

Tubular and Pivoted Bucket Conveyors

Hapman Tubular Conveyors move almost any bulk material—wet or dry—through any plane or angle. They're dust, liquid and odor-tight. Investigate!

WRITE for Bulletin T-C77



Exclusive top loading device on Pivoted Bucket Carrier handles fragile materials gently. Many other unique advantages.

WRITE for Bulletin P-C77

Hapman CONVEYORS, INC.
DIVISION HAPMAN-DUTTON COMPANY
KALAMAZOO MICHIGAN
In British Commonwealth & Europe: Fisher and Ludlow Ltd., Birmingham

When inquiring check 4725 opposite last page

NOW!

The handling of liquefied petroleum gases, refrigerants and other light non-viscous liquids

is a CINCH!

TYPE Z4

AURORA® APCO *Process* PUMPS

New and difficult applications in modern industry pose a challenge to pump designers. Aurora engineers have met this challenge completely with the APCO TYPE Z4 Process Pumps—which combine the ideal turbine-type features, special metals where required, single mechanical seal and other latest design features for SURE RESULTS. We invite your inquiry.

SPECIAL METALS

APCO'S are obtainable in any machineable alloy. Small amounts required. Result: ECONOMY.

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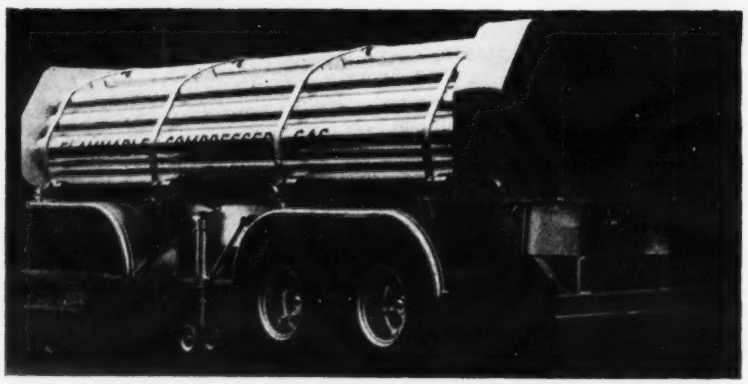
AURORA PUMP DIVISION
THE NEW YORK AIR BRAKE COMPANY
62 LOUCKS STREET • AURORA • ILLINOIS
EXPORT DEPARTMENT — Aurora, Illinois — Cable Address "NYABINT"

When inquiring check 4726 opposite last page

TAYLOR-WHARTON GAS TRANSPORTS



multiply the usefulness of bulk storage

If your operations require storage of compressed gases in bulk, it will pay you to put your storage facilities on wheels. The use of Taylor-Wharton Gas Transports enables you to move the supply to the point where it is needed at any particular time. Chemical, petrochemical, electronics and food processing companies operating their own gas producing plants, use these vehicles for inter-plant distribution of gases and for standby equipment.

Taylor-Wharton Gas Transports consist of specially constructed trailers in single and double axle models, mounted with a group of seamless steel storage pressure tubes made to ICC3A2400 specifications. The tubes are interconnected with valves and manifold to a common outlet in a weatherproof cabinet built on the rear of the trailer. Standard capacities range from 38,500 cu. ft. to 56,250 cu. ft. Other sizes as required.

Ask us for complete information, describing your requirements.

TW® TAYLOR-WHARTON CO. Harrisburg 24, Pennsylvania
Division of HARSCO CORPORATION

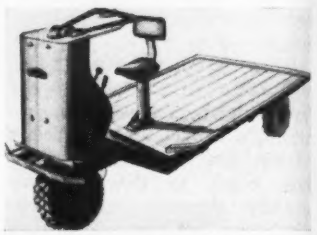
When inquiring check 4727 opposite last page

Low cost truck handles 'in-between' loads

Uses: For jobs that are too heavy for hand trucks, and too light for heavy equipment.

Features: Truck is low in initial cost and simple to operate and maintain.

Description: This "in-between" unit has load capacity of 1500 lb and a low bed for easy loading. Pulling capacity of 3500 lb permits towing of heavily loaded trailers. Truck is powered by 4-cycle engine that consumes only 1 pint of



Economical platform truck for "in-between" loading, hauling

fuel per hour. Simple controls provide three speeds, forward and reverse. Three-wheel brakes, pneumatic and abrasion-resistant tires, low center of gravity, and sturdy construction enable safe, efficient operation.

("Multiton-Excelsior" gasoline powered motor truck is product of Stokvis-Edera & Co., Inc., Dept. CP, Port Washington, N.Y. Check 4728 on the convenient form which is located opposite last page.)

German-made tractor has air-cooled engine

Like the little Volkswagen automobile, the Porsche-Diesel ("P-D") tractor offers advantages of air-cooled engine. National sales and service organization for German-made tractor is being developed and will soon be in operation. Besides eliminating freeze-up and overheating, "P-D" provides dependable and economic performance.

In addition to air-cooled 1 to 4 cylinder engines with horsepower of 11 to 44, trac-

UNITIZED WEIGHING

for conveyor systems

Only WEIGHING COMPONENTS offers a packaged unit that:

1. Fits your present or proposed conveyor system with little if any modification.
2. Responds only to vertical weight—not affected by side thrust, load placement or pile-up.
3. Measures rate and/or totalizes.
4. Offers high sensitivity with rugged simplicity.
5. Has automatic tare weight adjustment.
6. Electrical or pneumatic operation—your choice.
7. Use for indicating, recording and/or controlling . . .
8. Highest accuracy — no knife edges, levers or springs.
9. Lifetime construction.
10. Safe for all locations.

Full information available. Send for Bulletin 11.

W-C

WEIGHING & CONTROL COMPONENTS, Inc.
206-A Lincoln Ave., Hatboro, Pa.

When inquiring check 4729 opposite last page

tor features oil-operated hydraulic clutch, four or five speeds forward and reverse, hydraulic power lift, various shafts to drive working machinery, crawling gear that permits speed of only 700 meters (2296.6 ft) an hour, and adjustable track and weight variation to meet particular requirements.

German-made tractors are being distributed in this country

Versatility of the tractor includes operation in fairly deep water. Air-flow of engine can be regulated at will, so that tractor works at best possible temperature.

Each model is built from standard basic units. Principal components fit all models and spare parts are interchangeable. Distance between wheels of tractor can be changed according to needs. Clutch automatically disengages when the going gets too heavy, preventing overloading of the engine. Implements are easily and quickly attached.

(Tractors will be distributed by Porsche-Diesel of America, Inc., Dept. CP, 39 Sylvan Ave., Bridgeport, Conn. . . . or for more information check 4730 on convenient Readers Service slip located opposite last page.)

Hydraulic lift truck

Latest developments in manufacturer's line of manually propelled, battery-operated hydraulic-lift trucks are contained in 24-page catalog. Story of manufacturer's concept of applying hydraulic handling to achieve maximum potential with utmost economy is included. Cat 257 — Big Joe Manufacturing Company, Dept. CP, 47 Oak Street, Wisconsin Dells 1, Wis. . . . or for more information check 4731 opposite last page.

SIMPLE ARITHMETIC IN PACKING

When one large box does the work of several smaller ones . . . it adds up to savings in many directions. You pack your product faster, handle it more efficiently and store it in less space.

"King-size" Gaylord boxes are designed to hold as much as 2,000 pounds of such diverse products as bulk chemicals, metal parts, wax, and brake linings. The list is constantly growing. Your product could be next.

For any type of corrugated or solid fibre container to make your shipping more efficient, contact your nearby Gaylord office.

Gaylord Boxes

CORRUGATED AND SOLID FIBRE BOXES
FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES
KRAFT BAGS AND SACKS

GAYLORD CONTAINER CORPORATION ★ ST. LOUIS
DIVISION OF CROWN ZELLERBACH CORPORATION

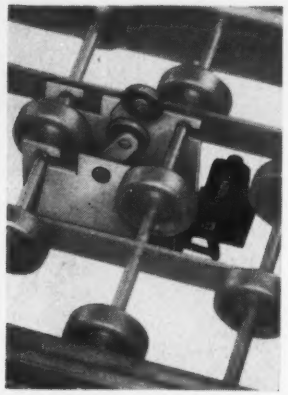
When inquiring check 4732 opposite last page

Counts number of cases as they travel along wheel conveyor

Counter is installed without altering wheel pattern

Uses: Counting and keeping track of cases and cartons being handled on wheel conveyors.

Features: Compact unit is installed without tools or alteration of wheel pattern. Can be positioned for flow-counting in either direction.



Case counter simply hooks over axles of wheels

Description: Counter hooks over axles of wheels. As cartons pass over, actuating arm is pushed down. When carton has passed, arm pops up as indicator registers an additional unit. Unit carries totals to 99,999. Minimum spacing of 2" between cartons is needed to allow arm to regain proper position.

(Case counter is manufactured by Rapids-Standard Co., Inc., Dept. CP, 342 Rapistan Bldg., Grand Rapids 2, Mich. . . . or for more information check 4733 opposite last page.)

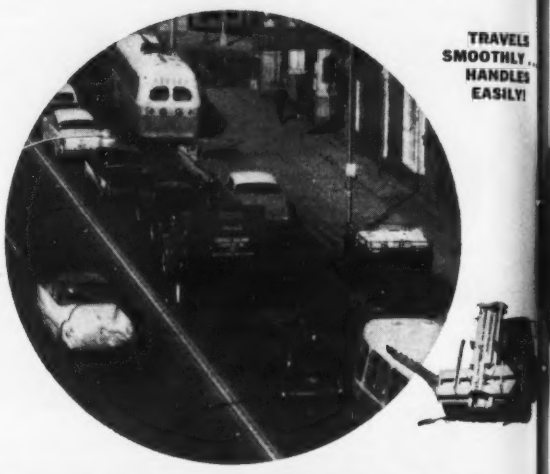
Ball bearing equipment

Manufacturer's ball bearing equipment being added to screw conveyor line is described in six-page folder. Installation and maintenance features are covered. Folder 2489 — Link-Belt Co., Dept. CP, Prudential Plaza, Chicago 1, Ill. Check 4734.

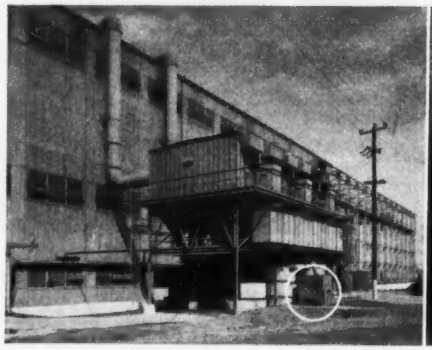
Here's Another New Development from Dempster Brothers to c

Now Automatic Pick-Up of Dempster-Dumpste

AUTOMATIC PICK-UP!

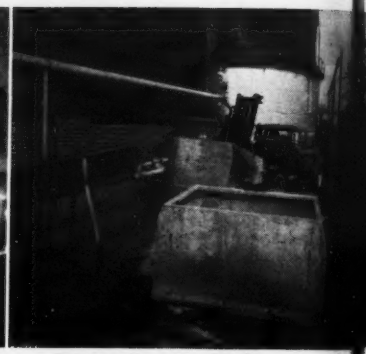


TRAVELS SMOOTHLY.. HANDLES EASILY!

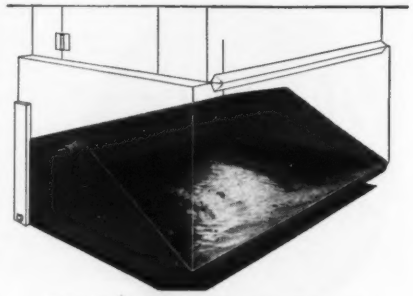


Here's a container adapted for collecting dust from two 75-ton furnaces.

Containers can be served inside buildings.



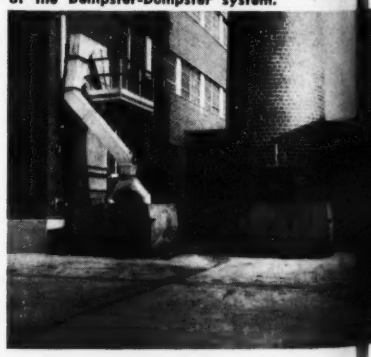
Dempster-Dumpster handles extremely heavy materials like this Fullers Earth.



Sump Bottom Containers are available. This leak-proof feature is desirable wherever moist, liquid and wet refuse is a problem.

Tilt Type Containers for handling liquid and solid materials are available.

Adaptation like this one for handling cinders fro furnaces illustrate another flexibility advanta of the Dempster-Dumpster system.



THE DEMPSTER DUMPSTER® SYSTEM

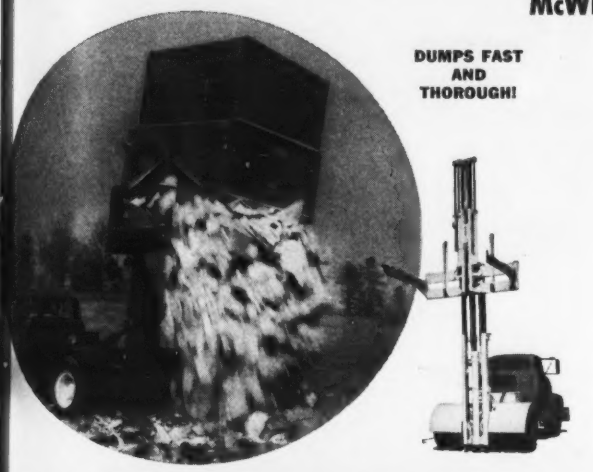
DEMPSTER BROTHERS

277 N. Knox, Knoxville 17, Tennessee

Materials Handling Cost in Chemical Plants - - -

Containers— Driver Never Leaves the Cab!

McWHIRTER MATERIAL HANDLING Co., Atlanta, Says:



DUMPS FAST AND THOROUGH!

"Our new Dempster-Dumpster GRD 304-F-2 speeds up collection of materials in Dempster-Dumpster Detachable Containers. The automatic pick-up feature of the GRD 304-F-2 makes for faster, easier, simpler handling of containers."

This new Dempster-Dumpster enables containers to be picked-up, hauled, dumped and returned to location without driver leaving cab. All this, plus shorter turning and maneuvering area requirements, and plus high dumping — a versatile range of dumping heights up to 11 feet. This new Dempster-Dumpster and the Dempster-Dumpster System offer many advantages for speeding-up handling of bulk material loads in big Dempster-Dumpster Detachable Containers that are worth consideration in your plant now! Write us today for complete literature. Or, if your operation would require greater payload handling capacities, ask us about our Dempster-Dumpsters built to handle payloads up to and over 36,000 lbs., plus detachable containers up to 21 cu. yds. in size. Manufactured by Dempster Brothers, Inc.

And services Skip Type Containers having required bale.

Acid materials like these stripped battery cases are just a sample of the type of wastes handled.

Many Standard and Special Tank Type Containers for handling liquids, chemicals, oils, etc., are available.

Big 15-yard Universal Containers are available. Note the area of the top opening. Standing in the container you would see the view as camera pictures it at right below. "Like trying to fill a bottomless pit," report many happy users.

DEMPSTER BROTHERS
creative engineers
successfully exploring new ideas to reduce your materials handling costs with the
DEMPSTER DUMPSTER SYSTEM

Clip and mail this coupon for FREE LITERATURE!

NAME _____

COMPANY _____

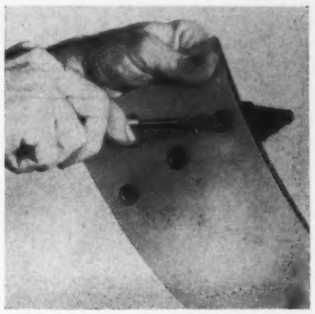
ADDRESS _____

CITY _____ STATE _____

Please send me folder on the new Dempster-Dumpster GRD 304-F-2 and the Dempster-Dumpster System.

Neoprene cleats attach to conveyor easily

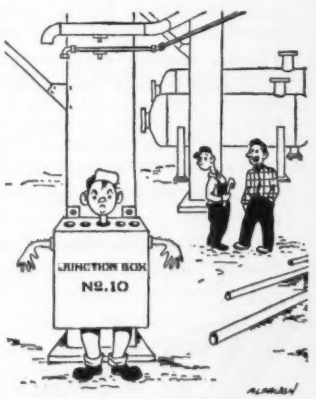
Molded neoprene cleats are screwed onto any conveyor belt quickly and easily. Threaded metal inserts are molded in base of cleat.



Cleats for conveyor belts are molded neoprene

Screws and countersunk washers, engaging inserts, sink below surface of belt, where they cannot come in contact with pulley.

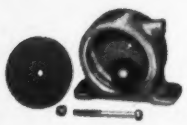
("Tatch-A-Cleat" is manufactured by T. H. Hinchcliffe, Dept. CP, 1450 La Loma Rd., Pasadena 2, Calif. . . . or for more information check 4735 on form located opposite last page.)



"The boss is really cracking down on absentees."

Thanks to Ann Alpaugh, Vulcan-Cincinnati, Inc., Cincinnati, Ohio

Move your Bulk Materials this Quiet, Low Cost Way!



Trouble-free AiroViber keeping bulk materials on the move.

Compact, power-packed Viberlec moving bulk materials fast and efficiently.

Fast, efficient movement of bulk materials at low cost is assured when you install Viber's AiroViber or Viberlec Vibrators. Their broad range of developed force prevents most types of bulk materials from arching, jamming or hanging up in hoppers, chutes, bins or feeders.

AiroViber, operated by compressed air, features only one moving part which gives you trouble-free service because there is no maintenance. Speed of the AiroViber is controlled by simple air valve and amplitude may be changed by using different sizes of steel balls. Where explosive conditions exist bronze balls may be used to reduce hazard. Exceptionally quiet operation.

Viberlec, electrically powered and completely sealed in steel, gives you long, quiet, faithful service and requires almost no maintenance. Viberlec's developed force may be changed by selection of heavy, medium or light eccentric weights. AiroViber and Viberlec are unaffected by dust, moisture, water, humidity, corrosive surroundings or contaminated atmospheres. Quick change mounting plates are an important feature of both vibrators.

Every vibrator is ruggedly constructed and tested to give you years of reliable service.

For trouble-free movement of your bulk materials you cannot beat a Viber AiroViber or Viberlec Vibrator.

For literature and detailed information write
VIBER COMPANY, 726 South Flower Street
Burbank 43, California.

VIBER CO

VIBRATORS

Pioneers and leaders in the manufacture of vibrators.

When inquiring check 4736 opposite last page

Operatorless tractor follows white painted line or strip of white tape

Paint a white line, lay down a strip of white tape. This is all that is needed to guide this tractor, for . . .

operatorless tractor follows painted white line on floor

Uses: Remote-controlled moving of materials and goods in or between plants and warehouses.

Features: Painted white line or white tape guides tractor wherever desired. This method is used wherever guide wires are not desired. Any good grade of white paint may be used.

Description: Guidance is maintained through operation of "sniffer box" located on underside of vehicle. Sniffer box contains small, low-powered light bulb and photoelectric cells. Light from bulb reflects on white surface and, in turn, actuates photo cells.

Presence of light transmits guidance to steering mechanism. Loss of light causes tractor to stop immediately.

System is compatible with present systems using wires. Conversion from optical to wire may be accomplished by changing sniffer box.

(Guide-O-Matic industrial tractors are manufactured by Barrett-Cravens Co., Dept. CP, 628 Dundee Rd., Northbrook, Ill. . . . or for more information check 4736A on form opposite last page.)

Two-station feeder weighs 40 batches per minute

Unit can handle two materials simultaneously

Uses: Weighing variety of dry, bulky materials and feeding these weighed lots into processing or packaging operations.

Features: For proportioning operations, two different materials can be handled simultaneously.

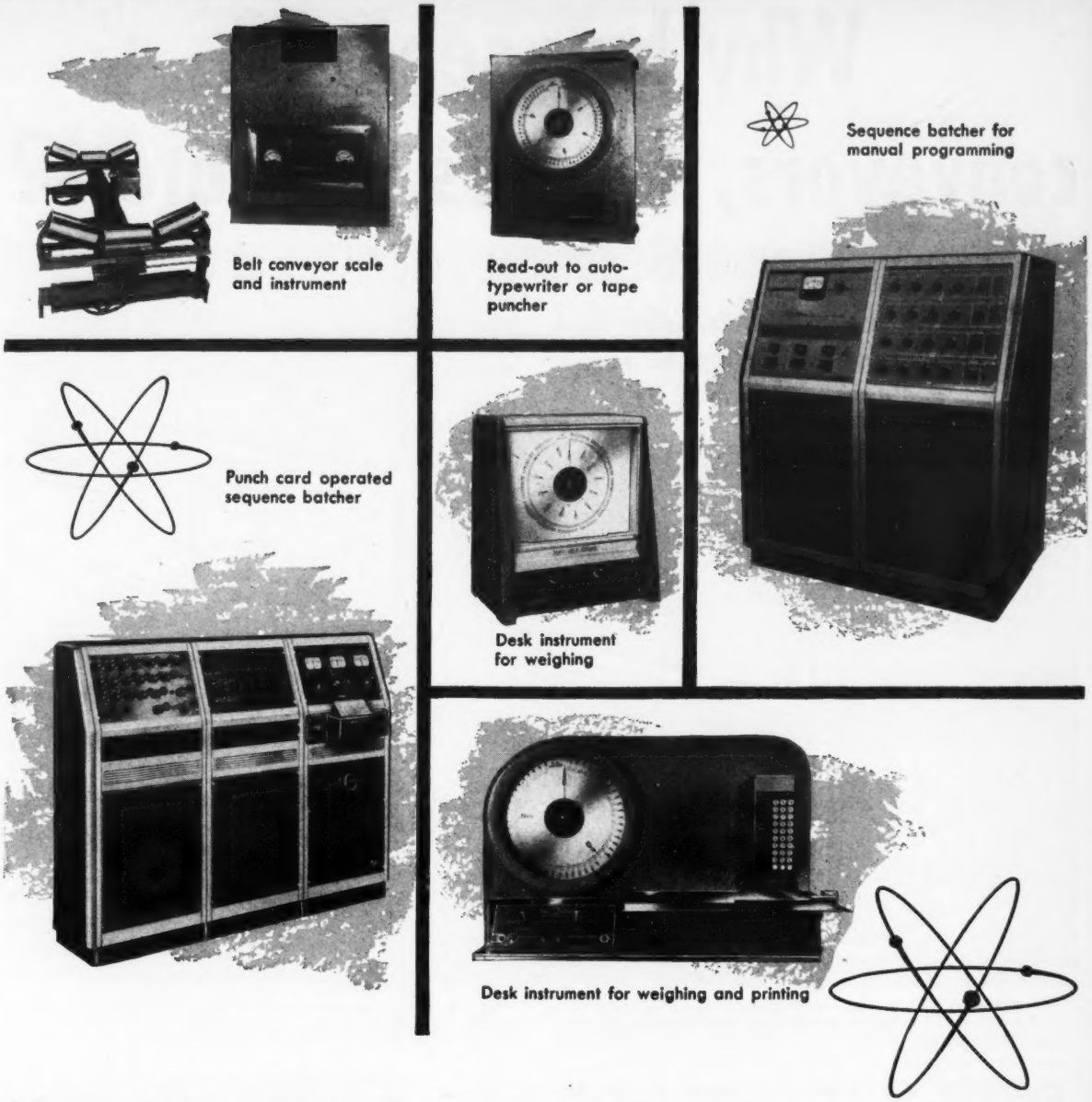
Two-station weigher-feeder handles 1-oz to 5-lb batches at 40 weighings per minute

Description: Two-station weighing unit is capable of handling materials over adjustable range from 1 oz to 5 lb at speeds up to 40 weighings per minute. Feed mechanism is available for converting unit into fully automatic filling machine.

(Two-station weighing unit is product of Glengarry Processes Inc., Dept. CP, Bay Shore, N.Y. Check 4737 on form opposite last page.)

Roller chain features

Pointing out construction features and illustrating various applications, 16-page bulletin presents manufacturer's bushed roller chain. Specifications for roller chains and attachments are listed. Book 2454 — Link-Belt Co., Dept. CP, Prudential Plaza, Chicago 1, Ill. Check 4738.


Belt conveyor scale and instrument
Read-out to auto-typewriter or tape puncher
Sequence batcher for manual programming
Punch card operated sequence batcher
Desk instrument for weighing
Desk instrument for weighing and printing

Now...we're way beyond weighing–electronically!

The Fairbanks-Morse line of electronic instrumentation performs many functions beyond the elementary process of weighing. It will, for instance, register and record weights at a remote location. It will perform automatic sequence batching—say, from a punch card. It will translate weight messages into the language understood by automatic typewriters, automatic adding machines, tape punchers, other data processing machines. It will control a complete plant materials flow program.

This instrumentation is now available with Fairbanks-Morse truck and track scales, axle-load scales, warehouse and portable scales, and many other types of weighing machines.

The weight message is created in the electronic load cell. Fairbanks-Morse employs it in two ways. The *Full Electronic* system utilizes multiple load cells. In the *Levetronic* system, a single load cell is incorporated in a conventional lever system. (Your present lever scale can probably be converted to *Levetronic.*)

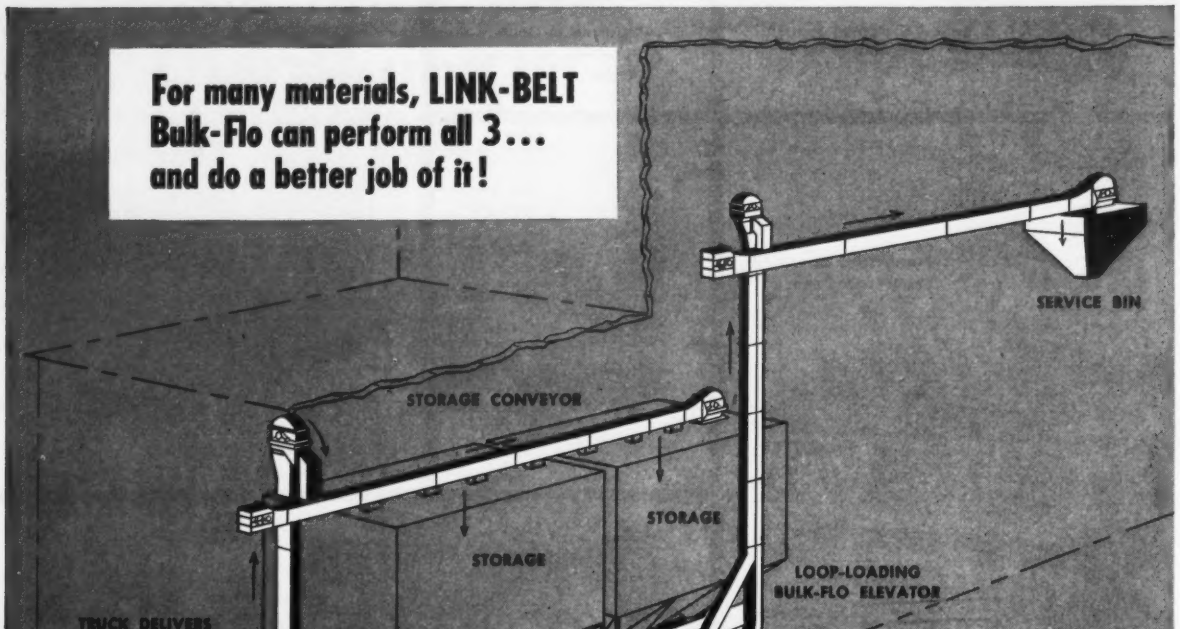
New Fairbanks-Morse literature is available on all these electronic scales, batchers and instruments. Write today. Fairbanks, Morse & Co., Scale Division, Dept. CP-7, 600 S. Michigan Ave., Chicago 5, Ill.

FAIRBANKS-MORSE
a name worth remembering when you want the BEST

SCALES • PUMPS • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MOWERS • MAGNETOS

When inquiring check 4739 opposite last page

Why buy separate conveyors, feeders, elevators?

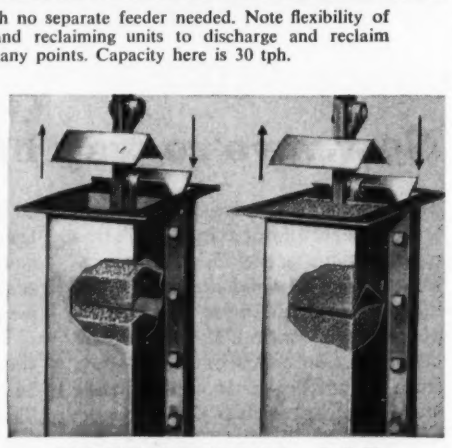


FIVE BULK-FLOS form an efficient system for handling material from unloading to storage, and into processing at this plant. Material is dumped directly into hopper of L-type Bulk-Flo, with no separate feeder needed. Note flexibility of distributing and reclaiming units to discharge and reclaim material at many points. Capacity here is 30 tph.

FUNCTIONING as a conveyor, a feeder and an elevator—all in one compact, enclosed assembly—Link-Belt Bulk-Flo saves the space and expense of individual units. Initial cost is much lower—so are power requirements. And because Bulk-Flo's flights operate in a close-fitting casing, you get positive movement of materials even when it's loaded to less than full capacity. Unlike other designs, feed can be varied to suit changing demands.

Bulk-Flo offers gentle handling as well. Material is carried and protected in individual "compartments"—degradation is minimized.

Your Link-Belt office or Book 2475 can quickly tell you how Bulk-Flo can fit into your plant.



PARTIALLY OR FULLY LOADED —Bulk-Flo assures positive, gentle movement of materials. Unit is self-clearing, minimizes contamination when handling different products.

LINK-BELT

BULK-FLO FEEDERS • CONVEYORS • ELEVATORS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14,801

When inquiring check 4740 opposite last page

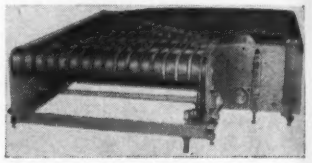
Provides full 90° turn for conveyor

No rollers to stick, no damage to product

Uses: For moving material around corners in conveyor systems.

Features: Device provides full 90° turn. There are no rollers to stick. Deflector damage to product is eliminated.

Description: Device is based on series of narrow belts running in grooved pulleys, meeting to provide angular direction of flow. Belts are banked for constant contact with material in motion. Positive belt guides prevent side sheer as material changes direction.



Device gives full 90° turn to conveyor systems

Slight differential in speed between bank of belts produces positive turning action. Design of belts and mountings eliminates belt friction due to turning. Belts are spaced to carry small as well as large or long articles, and give ample support to flexible products.

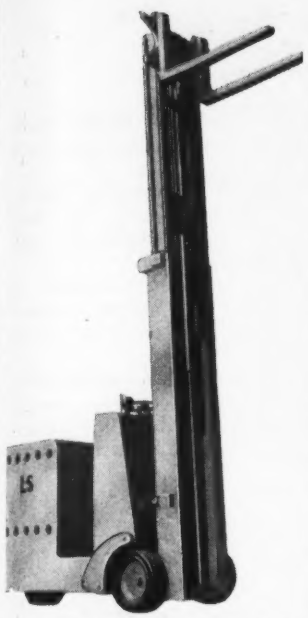
(Stewart-Turn is product of Stewart-Glapat Corp., Dept. CP, 1639 Moxahala Ave., Zanesville, Ohio. Check 4741 on Reader Service slip opposite last page.)

Lift truck is protected against dusts

Uses: For handling materials in dust-laden atmospheres.

Features: Truck is constructed so that it is protected against effects of metal, coal, coke, and grain dust, as well as carbon black.

Description: Both traction and pump motors of fork-lift truck are totally enclosed and provided with special, extra-



High-lift fork truck is protected against effects of dust

wide, wrap-around brush covers and cork neoprene gaskets. Starting and first speed resistors are mounted in tightly gasketed compartment, welded integrally with main control compartment. Main contactors and timing device are enclosed with 16-gage sheet steel housing and tight-fitting gasketed flanged cover.

(Fork-lift truck is product of Lewis-Shepard Products, Inc., Dept. CP, 125 Walnut St., Watertown 72, Mass. Check 4742 on form opp. last page.)

Caustic soda wall chart

Manufacturer offers wall chart on safe handling and unloading of caustic-soda tank cars. Written in nontechnical language, chart gives suggestions for protective clothing and equipment, rules and precautions to be followed in unloading, handling and storage of caustic soda, first aid measures to be followed in event of an accident, and instruction for safely thawing caustic soda in tank cars. Caustic soda wall chart — Solvay Process Division, Allied Chemical & Dye Corporation, Dept. CP, 61 Broadway, New York 6, N.Y. Check 4743.

(Courtesy A. H. Mathieu & Company)

MANHATTAN Rubber Linings Assure Permanent Protection against Corrosion, Contamination, Abrasion

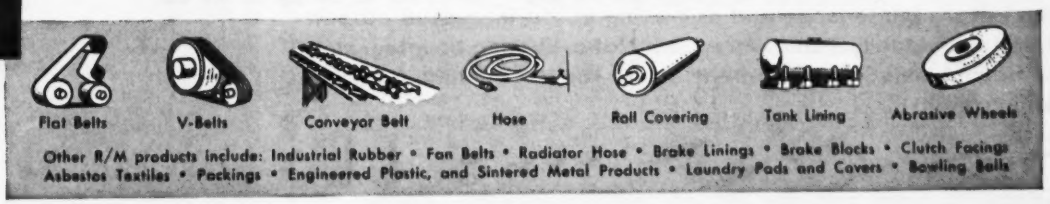
You get *real* protection . . . *permanent*, positive protection against losses due to corrosion, contamination and abrasion with Manhattan Rubber Linings. That's because Manhattan engineers have developed a special method of bonding rubber to metal so securely that actual on-the-job tests have proved it can't be separated! Manhattan Rubber Linings are made from thick, calendered sheets of natural or synthetic rubber, whichever is best suited, for maximum durability. They expand and contract with the metal under temperature changes—won't harden or crack. Their resistance to most acids, caustics and alkalis is as permanent as is possible to make them.

To make certain your Manhattan Rubber Lining is flawless and permanent, every Manhattan Lined Tank is tested under high voltage to detect any possible imperfections. More than 60 years of research and manufacturing "know-how" at Manhattan have led to the development of many high quality linings . . . each designed for specific application. Regardless of the size or shape of your processing equipment, Manhattan has the facilities to handle your job . . . the most modern and complete available today. Equipment too large to be shipped can be field lined and vulcanized by skilled Manhattan crews. For rubber lining that lasts longer, contact an R/M representative at the Manhattan Rubber Lining plant nearest you.

RM 621

RUBBER LINING PLANTS AT PASSAIC, N. J. and NORTH CHARLESTON, S. C.
MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.



Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings
Asbestos Textiles • Packings • Engineered Plastic, and Sintered Metal Products • Laundry Pads and Covers • Bowling Balls

When inquiring check 4744 opposite last page

PACKAGING FLEXIBILITY PAYS OFF AT FEDERAL

A Lynch Robo-Lift elevating conveyor and a Lynch Robo-Wrap automatic unit packager combine to reach new production highs, lower packaging costs for the Federal Tool Corp., Chicago. Requiring but one operator, the integrated team produces an average of 45 packages a minute ... has the flexibility needed for quick changeover from one size to another. Manually fed, Robo-Lift takes the product "up 'n' over" for fast Robo-Wrap package forming, filling and sealing—all in one continuous action. The hard-working, Robo-Lift—Robo-Wrap team operates three shifts a day, six days a week... has logged just nine hours downtime in three months! Learn how Robo-Lift, Robo-Wrap packaging can serve you ... bringing lower maintenance and operating costs, increased output. Used individually, Robo-Wrap and Robo-Lift can be integrated with your existing equipment. Write for full details. Address Department B.

FEDERAL TOOL ROBO-WRAPS PLASTIC ITEMS OF VARIOUS SIZES, SHAPES

LYNCH ROBO CORPORATION
A Division of LYNCH CORPORATION
Anderson, Indiana

When inquiring check 4745 opposite last page

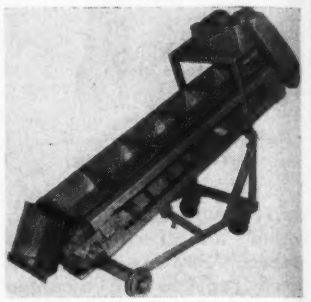
Conveyor consists of hingeless troughs

Elimination of hinges means reduced maintenance costs

Uses: For conveying liquids, chips, scrap, hot and cold items, sand, chemicals, and powder.

Feature: Elimination of troublesome hinges reduces maintenance costs to minimum.

Description: Hingeless metal troughing conveyor can be adapted for handling corrosive material by using stainless steel buckets. Length, width, and shape of unit can be adapted to suit application. Installation can be mobile or stationary. Minimum height from floor is 14".

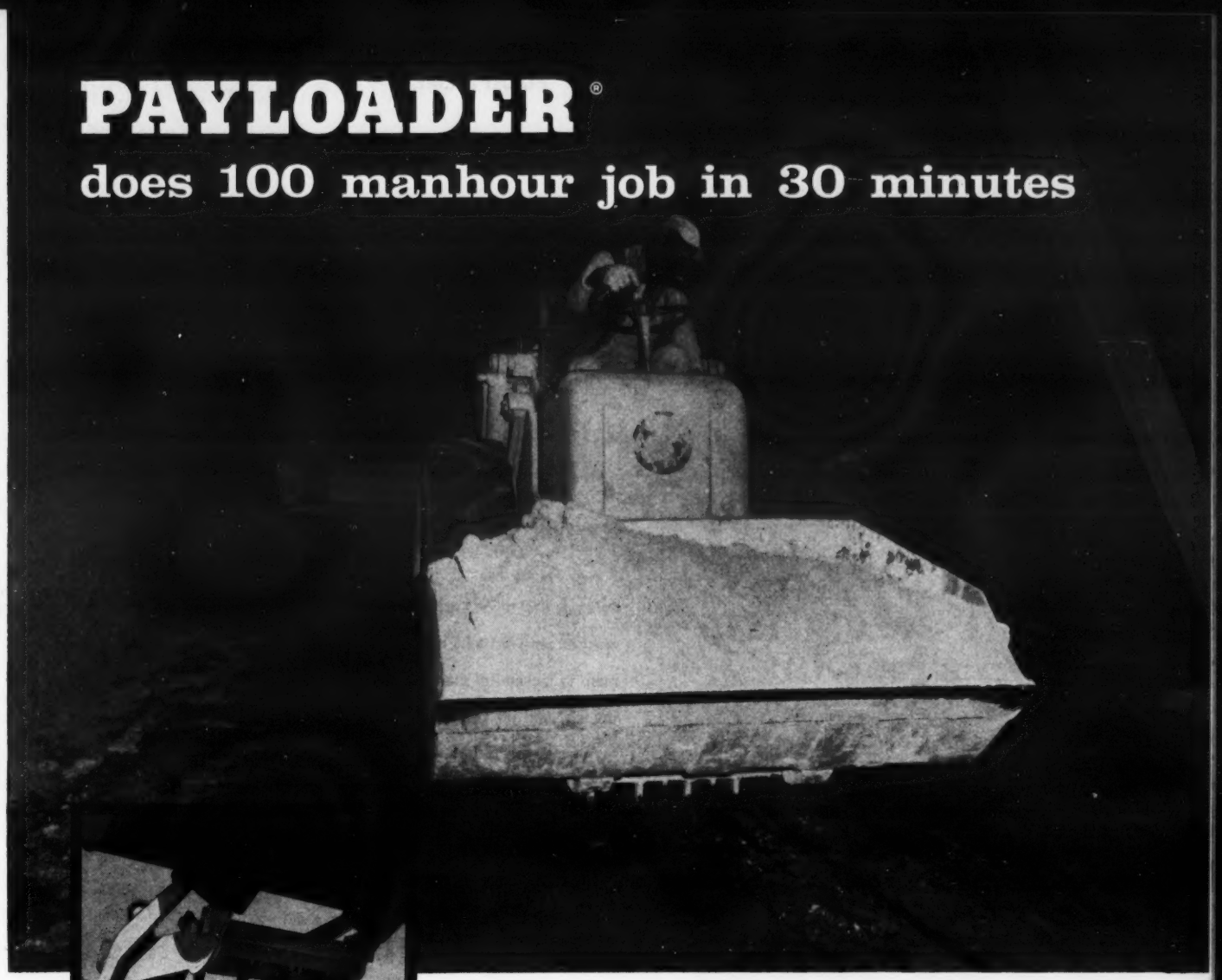


Hingeless metal troughing conveyor provides low-maintenance operation

(Conveyor is product of R. T. Sheehan Co., Dept. CP, PO Box 345, Plymouth, Michigan. Check 4746 on form opposite last page.)

PAYLOADER®

does 100 manhour job in 30 minutes



SCARIFIER ATTACHMENT
consists of 4 husky teeth hinged on a bracket behind the bucket. Teeth dig only when bucket is lowered and machine travels in reverse — do not interfere with normal bucket operation . . . are quickly removable.

New scarifier attachment quickly rips-up packed fertilizer

Removing the solidly-packed fertilizer that accumulates on concrete runways and floors usually is a laborious pick-and-shovel job. But now, the new Model HAH "PAYLOADER", with the scarifier attachment, can do the job in a fraction of the time and at very little cost. For example, at this fertilizer plant the Model HAH cleaned up an area in 30 minutes that formerly required 100 hours of hard, manual labor . . . much to the amazement and gratification of the plant management.

This is another example of how you get more and better performance from a "PAYLOADER". Standard operating features of the new, 1 cu. yd. Model HAH "PAYLOADER" include: 45° bucket roll-back at ground level; hydraulic load-shock-absorber; power-transfer differential; powerful breakout digging action; power-steering and hydraulic brakes. Ask your "PAYLOADER" Distributor to demonstrate what a Model HAH or other sizes will do for you. See him, or write us.

THE FRANK G. HOUGH CO.
744 Sunnyside Ave., Libertyville, Ill.

Send data on "PAYLOADER" tractor-shovels
☐ Model HA (18 cu. ft.) and HAH (1 cu. yd.)
☐ Larger models up to 2¼ cu. yd.

Name _____

Title _____

Company _____

Street _____

City _____ State _____

81

For more information on product at right, specify 4747 see information request blank opposite last page.

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

Lining a big chemical-proof tank in Heil's Cleveland plant.

There's ONE Lining Best Suited to YOUR Need —LET HEIL SPECIALISTS HELP YOU SELECT IT

Which lining best suits each of your needs for tanks and chemical-proof equipment? If it's hard to pick the right one, ask a Heil specialist. Heil is experienced with *all* reliable chemical-proof and corrosion-resistant materials — and Heil can fabricate complete equipment from them all, according to your need.

Stringent tests, laboratory facilities, back Heil quality.

Heil's experience is both long and broad — 28 years of service, to chemical producers, chemical process industries, steel industry, platers, etc., etc. It is the Heil method to take into account not only chemical and physical requirements, but also your economic requirements. Write on your letterhead for Heil bulletins on Heilastic linings, and other chemical-proof equipment you require.

HEILASTIC LININGS — Lead, Koroseal*, Rubber, Plastic, Epoxy.

METAL FABRICATION — Steel plate, sheet metal, lead, alloys.

Tanks, linings, heaters, heat exchangers, exhaust systems, lined and solid plastic fans, fume scrubbers, packed towers.

CHEMICAL PROOF LININGS · TANKS HEATERS PLASTICS

HEIL PROCESS EQUIPMENT CORPORATION

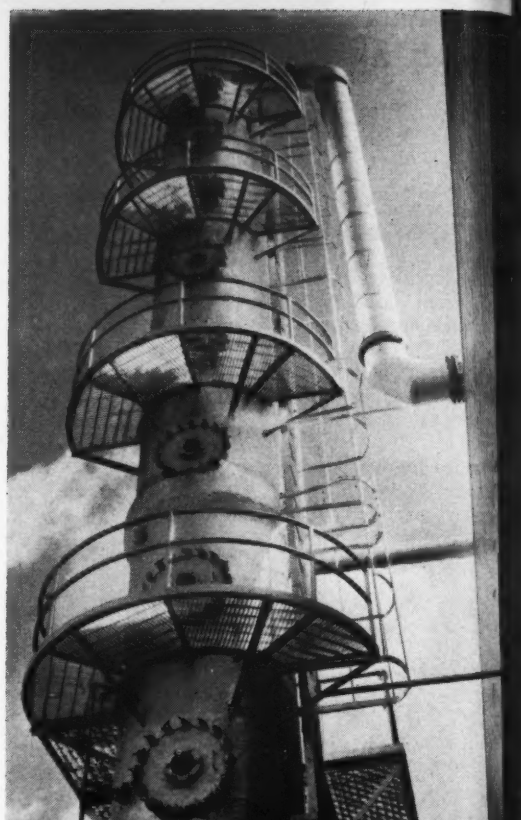
12901 Elmwood Ave. • Cleveland 11, Ohio

One source — one responsibility

*Product of B. F. Goodrich Co.

When inquiring check 4748 opposite last page

cp PROCESSING EQUIPMENT



Columns and towers are among the most expensive items of equipment in a chemical plant. Getting the best unit for your needs at the lowest cost can be quite a trick. To help make the job a little easier here are some hints on . . .

specification and procurement of towers

W. F. SWANTON, Project Engineer
The Pfaudler Company
Rochester, New York

Getting the best column at the lowest cost depends largely on the quality of the specifications submitted by you, the purchaser, the time allowed the vendor to quote, and your analysis of the bids received. Chief among the general rules on this subject are:

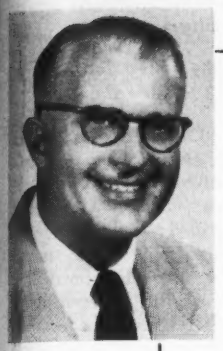
1) Make your specifications as complete as possible in terms of your problem but avoid specifying non-essential details which have not been thoroughly investigated.

2)Make it possible for the vendor to use his standards or to suggest improvements in your design.

3)Allow vendor sufficient time to do thorough job of estimating. Permit bidders at least three to five weeks to quote on a completely designed custom-built tower — an additional two to three weeks if design includes performance requirements.

4) Give due weight to the experience, integrity, and process knowledge of your bidders.

5) Keep in mind that there are two kinds of column manufacturers — those who build to detailed mechanical specifications, and those who design and build to meet performance specifications. Both guarantee workmanship and materials, but only the second group guarantees that the design will also meet capacity and performance specifications.



ABOUT YOUR AUTHOR

W. F. SWANTON holds a B. S. degree in chemical engineering from Massachusetts Institute of Technology and a M. S. degree from the University of Rochester. His work at Pfaudler consists of engineering complete plants which use corrosion-resistant equipment. Before coming to Pfaudler, he was doing design engineering with Jackson and Moreland and the U. S. Bureau of Reclamation. He also taught nine years at the Rochester Institute of Technology, U. S. Naval Academy, and the University of Rochester. He was associated with Core Laboratories, Inc. Mr. Swanton is a licensed professional engineer in New York State and is a member of the American Institute of Chemical Engineers.

Watch details carefully, omitting those not absolutely essential to the operation, safety, or service life of the column. Suggestions offered by the fabricator may help to lower costs. Here are some actual examples:

Case I. Fabricator asked to quote on column for which customer specified 15 psig internal pressure and also full internal vacuum. Because of full vacuum specification it was necessary to increase shell thickness two sizes over that shown on drawings submitted. A check showed that column would not be used for a vacuum greater than 5" Hg. By deleting full vacuum specification, fabricator was able to quote to original specifications.

Case II. Design specifications called for reinforcement pads around the larger openings. Column manufacturer estimated this design and one using the next heavier plate size material to eliminate the need for pad reinforcement. Savings in fabricating costs by eliminating pads more than offset the additional cost of shell material.

Case III. Column originally specified as solid stainless. Check of operating service showed that clad material would be acceptable. Specification was changed and customer saved $11,500, or 15% of total column cost.

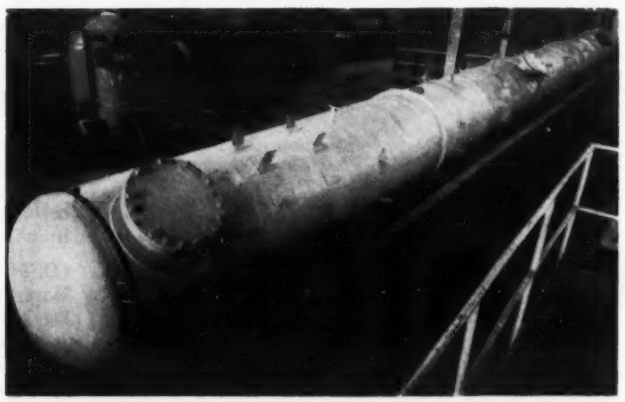
Economic Breakpoint

The economic breakpoint between solid, stainless, and clad material depends on factors other than thickness, but since the normal minimum total thickness for clad material is 3/16", little or no saving can be expected when the required thickness is under ¼", and clad may even be more expensive at thicknesses below 3/16".

Unnecessary tolerance requirements also can run up the cost. These should be limited only to those necessary for successful operation of the column. If time permits, a good procedure is to have each bidder submit his standards. Occasional requoting by the two or three lowest bidders may be required before placing the order, but this practice could well result in significant savings.

Nozzles and flanges offer possibility for

Turn to next page



Manholes, flanges, and nozzles offer possibility for savings. Equipment manufacturers frequently are able to fabricate these items cheaper than if commercial equivalents were purchased

How to keep a

clean screen

when sizing sticky materials

LINK-BELT ALONE heats screens with a "series" arrangement requiring fewer cables, lower initial cost . . . providing less power loss, more even heating. Above, each of five "UP" screen cloths is connected to 12-kva transformer.

Electrically-heated cloth enables LINK-BELT "UP" vibrating screen to deliver its full capacity

HERE'S a screen delivering high-velocity action that's unsurpassed for fast, accurate sizing. And to guard that efficiency against blinding by sticky or hygroscopic fines, Link-Belt offers a superior electric screen-heating arrangement. Among its advantages:

GREATER OUTPUT. Open mesh may boost capacity as much as 50%. Downtime for cloth cleaning and replacement is eliminated.

BETTER, MORE UNIFORM PRODUCT. Clear cloth provides more accurate sizing.

LONGER CLOTH LIFE. No whipping due to material accumulation.

LABOR SAVINGS. Ends mechanical cleaning.

Write for Book 2377-A—full data on "UP" screens. Your Link-Belt office has facts on the heating feature.

LINK-BELT

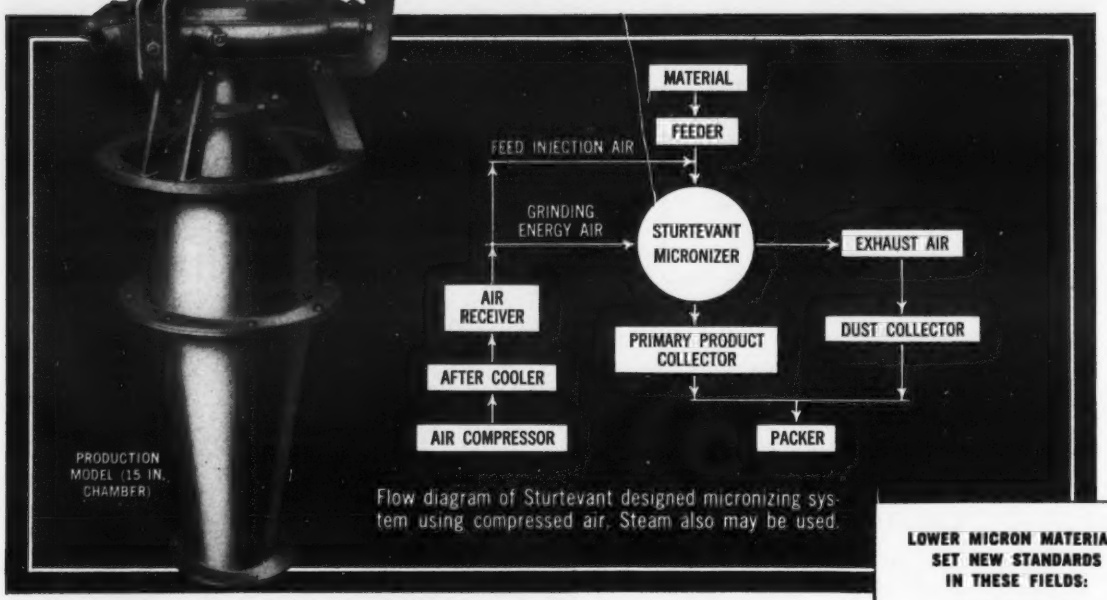
VIBRATING SCREENS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14,329

When inquiring check 4749 opposite last page

Need ½ to 44 Micron Particles?

Sturtevant Micronizers* Reduce, classify in one operation — make 325 mesh obsolete



Flow diagram of Sturtevant designed micronizing system using compressed air. Steam also may be used.

Particles Grind Each Other, Classifying is Simultaneous; No Attritional Heat

One operation. Sturtevant Micronizers grind and classify in a single fluid-jet chamber — provide fines in range from ½ to 44 microns to meet today's increased product fineness requirements. Because of impact action and cool atmosphere, even heat-sensitive materials can be handled.

No moving parts. Particles in high speed rotation, propelled by compressed air or steam entering shallow grinding chamber at angles to periphery grind each other by violent impact. Design provides for instant accessibility, easy cleaning.

Simultaneous classification. Centrifugal force keeps over-size materials in the grinding zone, cyclone action in central section of chamber classifies and collects fines for bagging. Rate of feed and pressure control particle size of fines.

Can combine other processes. Sturtevant Micronizers can be adapted for coating one material with another and for effecting chemical reactions and changes in physical characteristics, while in process of reducing solids to micron size.

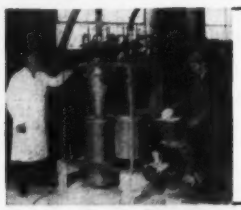
Eight models available. Grinding chambers are in eight sizes, ranging from 2 in. diameter laboratory model (½ to 1 lb. per hr. capacity) to large 36 in. diameter production model (500 to 4000 lbs. per hr. capacity). Send today for fully descriptive literature.

LOWER MICRON MATERIALS SET NEW STANDARDS IN THESE FIELDS:

Pharmaceuticals
Pigments (natural and synthetic)
Copper compounds
Filler materials
Aluminum compounds
Resins
Flour
Sugar
Calcium compounds
Heat sensitive materials
Magnesium compounds
Zinc compounds
Waxes and fatty acids
Fungicides and insecticides

Fluid-Jet Systems For Special Needs

A 30 in. Sturtevant Micronizer is reducing titanium dioxide to particle size under 1 micron at a feed rate of 2250 lbs. per hr. For another firm, a 24 in. model grinds 50% DDT to 3.5 average microns at a solid feed rate of 1200 to 1400 lbs. per hr. A pharmaceutical house is using an 8 in. model to produce procaine-penicillin fines in the 5 to 20 micron range. Iron oxide pigment is being reduced by a 30 in. Micronizer to 2 to 3 average microns at rates of 1000 lbs. per hr. Sturtevant Engineers will help you plan a Fluid-Jet system for your ultra-fine grinding and classifying requirements. *Write today.*



CAN TEST OR CONTRACT MICRONIZING HELP YOU?

Laboratory test-micronizing of your own material, or production micronizing on contract basis, are part of Sturtevant service. See for yourself the improvement ultra-fine grinding can contribute to your product. Or, if you have limited requirements for ultra-fine grinding, Sturtevant's contract micronizing service may be the economical answer. Write for full details.

* REGISTERED TRADEMARK OF STURTEVANT MILL CO.

STURTEVANT

MILL COMPANY 119 Clayton St., Boston 22, Mass.

CRUSHERS • GRINDERS • SEPARATORS • BLENDERS • CONVEYORS • ELEVATORS

When inquiring check 4750 opposite last page

High capacity screen has no moving parts, doesn't blind

Especially suited for work in 8 to 48 mesh range

Uses: Continuous wet screening of slurries containing non-fibrous solids

Features: Gravity-type unit is particularly adaptable to separations in 8 to 48 mesh range. Capacity is about 200 gal per ft of width per minute for 48 mesh separation and as high as 500 gal per ft per minute for 8 mesh material.

Description: Unit consists of a concave, horizontal-wedge-bar type of screen secured in a stationary housing. Integral part of housing is a feed box equipped with both an inlet port and feed spout. Latter serves to distribute incoming slurry across full width of screen in such a manner that feed strikes curved surface tangentially.

Undersize material which passes through screen is collected in lower part of housing and is discharged through another port. Oversize product flows across a lip at base of screen.

Particle size separation is controlled by width of openings between stainless steel wedge bars. Distance between each bar is about twice diam of largest particle desired in screen undersize. As incoming slurry flows by gravity across concave arc, a layer of slurry, with undersize material, is deflected downward by the bar.

Remainder of slurry passes across face of bar. As this stream strikes edges of succeeding bars, additional layers are sliced off until only undersize solids remain in slurry. Larger particles do not pass through openings between bars but are deflected upwardly to follow curvature of screen to discharge lip. Absence of moving parts results in minimum maintenance. Units are in four standard sizes ranging in width from one to four ft.

(DSM Screen is product of Dorr-Oliver Incorporated, Dept. CP, Barry Place, Stamford, Conn. Check 4751 on form which is located opposite last page.)

Horizontal contactor stops channeling, runs continuously

Unit can be used for variety of operations

Uses: Extracting, leaching, ion-exchange, decoloring, deodorizing, crystallizing, washing, and flotation operations. Unit can also be used as reactor for liquids with a solid catalyst.

Features: Continuous horizontal contactor features slow-motion agitation action which results in high degree of solid-liquid contact without channeling.

Description: Unit consists of a horizontal trough which is covered, sealed, and/or jacketed for heating or cooling.

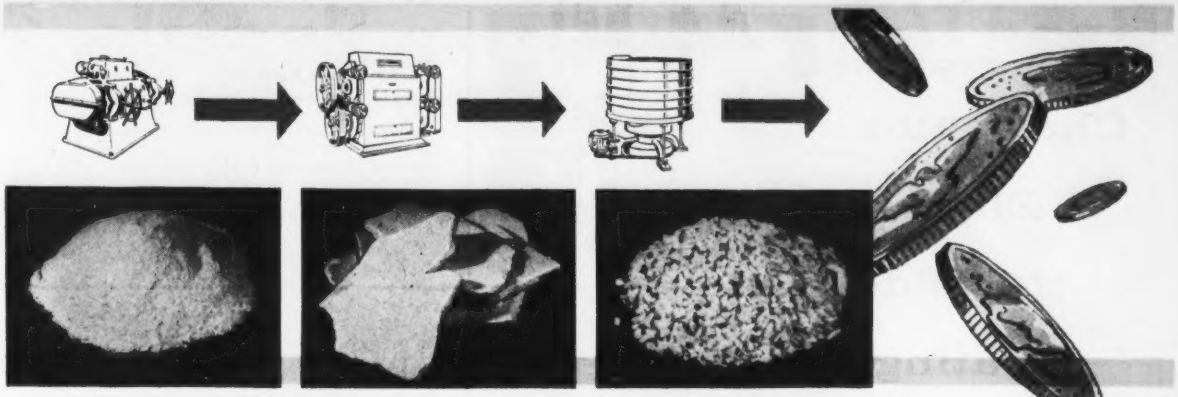
Any number of troughs can be connected in series for any desired solid-liquid contact time

Any number of troughs can be connected in series for any desired solid-liquid contact time.

Rotating shaft runs down center of trough. Paddles are attached to shaft to form an interrupted helix. Paddles convey solids from one end of trough to other, thoroughly and slowly tumbling material in process.

At solid discharge end, a scoop attached to rotating shaft pushes material out and into take-away conveying mechanism. Scoop is designed to remove solids free of liquid. Provisions are made for removing solids or liquid at selected points during process and for easy side stream addition. Unit can also be operated counter-currently. Automatic controls are available to regulate washing time and rate of flow.

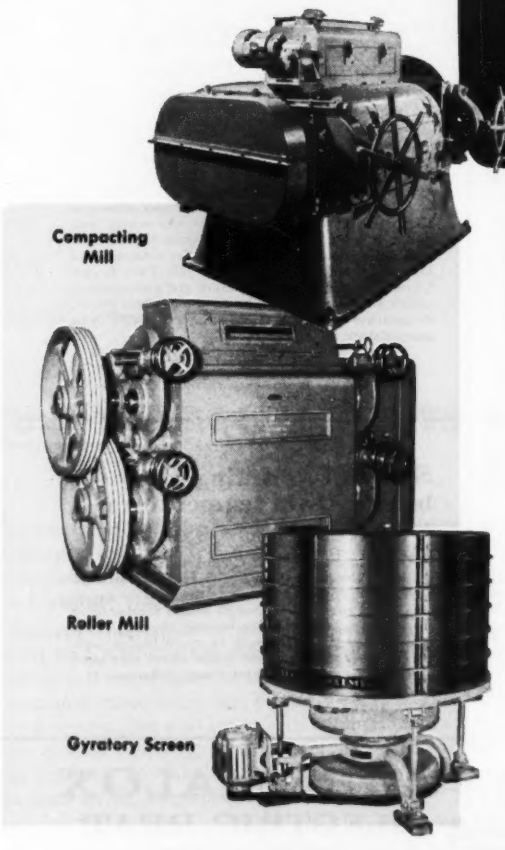
(Continuous contactor is product of Gifford-Wood Company, Dept. CP, Hudson, N. Y. Check 4751A on form opposite last page.)



Converts WASTE into PROFIT

ALLIS-CHALMERS
Compacting Process

it's mechanical
it's economical



You start with a pile of practically worthless material and wind up with a profit! Magic? Well, hardly – unless you want to call the mechanical efficiency of the Allis-Chalmers Process System magic.

How It Works

In a recent installation the conversion starts with an unusable, unacceptable minus 30 mesh chemical salt . . . fines created in the original process. An Allis-Chalmers compacting mill densifies these fines into flakes or slabs. Flakes are granulated in an Allis-Chalmers roller mill. Final separation is made in an Allis-Chalmers stainless steel gyratory screen. Result – 70 to 80% recovery of salable product. What's more – the resulting granules equal or surpass the natural product in every respect.

The entire system is mechanical; therefore, it's more economical than controlled crystal growth.

For More Information

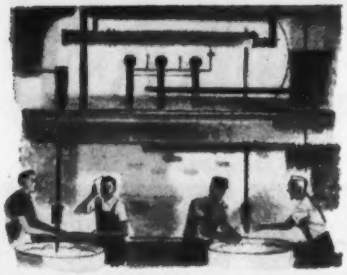
Get the complete story from your A-C representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. Ask for Bulletin 25C6177J.

ALLIS-CHALMERS

A-5345

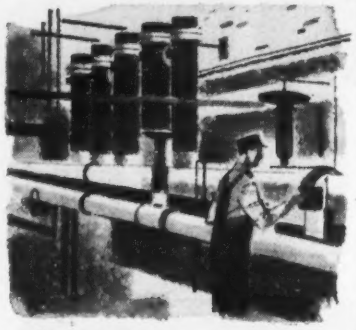
When inquiring check 4752 opposite last page

Chromalox® Electric "Job-side Heating" for anything that's piped



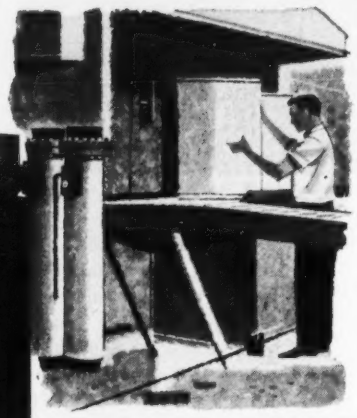
WATER—Factory heats water for washroom

During summer boiler shut-down, this company uses Chromalox Circulation Heaters and a ceiling-mounted storage tank to provide hot water for after-work clean up. Tapped steel mounting lugs factory-welded to the heaters made installation quick and easy. Water is heated mainly at night with offpeak power at lowest rates.



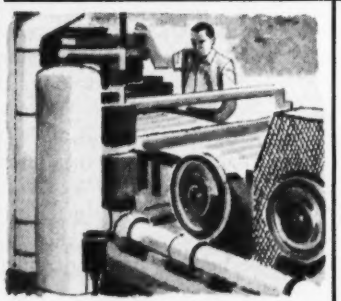
AIR—Aircraft factory heats air for thermodynamic testing

This nationally prominent aviation company installed seven Chromalox Electric Circulation Heaters to pre-heat air used for product testing. Four 80 kw heaters are rated for a maximum air flow of 450 lbs. per minute at 285 psi. Air enters the circulation heaters at from 90-210°F and is raised to a maximum of 900°F. Three 50 kw heaters have a maximum air flow of 250 lbs. per minute at 100 psi.



TRANSFER FLUIDS—Container manufacturer circulates hot oil to melt wax

As fibre drums leave this manufacturer's production line, a wax coating is applied for a smooth, grease-proof, moisture-proof interior. For a uniform coating of the desired thickness, wax must be sprayed at a constant 240°F temperature. A nozzle sprays wax up into the inverted drums as they are placed on a drain rack. As excess wax drains to a basin beneath, it is reheated and used again. The catch basin is heated by a transfer of heat from coils containing hot oil. Two 15 kw Chromalox Circulation Heaters are thermostatically controlled to keep the oil at a uniform 400°F. A separate thermostat maintains the 240°F wax temperature in the reservoir.



STEAM—Printing plant boosts steam temperatures to speed ink drying

A Chromalox Electric Circulation Heater is mounted alongside this press to boost steam temperature to 750° and eliminate the need for excessive boiler pressure. Although steam temperature takes a quick drop after leaving the heater, it still reaches the paper web at much higher temperatures than when the boiler alone was used and the steam had to travel a long distance.

Get the full story about Chromalox Circulation Heaters from your Chromalox Representative or write us direct for Bulletin 701 and new Case Studies.

CHROMALOX
ELECTRIC HEAT
Edwin L. Wiegand Company
7517 Thomas Boulevard
Pittsburgh 8, Pa.

C-2128A

When inquiring check 4753 opposite last page

Mixer can be mounted in threaded bung of 55-gal drum

Uses: Agitating drum-contained liquid mixtures.

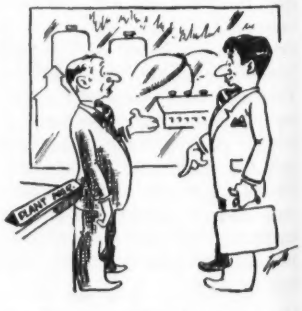
Features: Lightweight unit is designed for easy mounting in threaded bung of standard 55-gal metal drum. Agitator provides thorough mixing action without damaging or destroying drum. Once started, unit requires no further operator attention.

Description: Drum agitator consists of electric drive motor, aluminum mounting cage, and mixing shaft. Motor is 1/3 hp, 115-volt AC, totally-enclosed type. Two specially

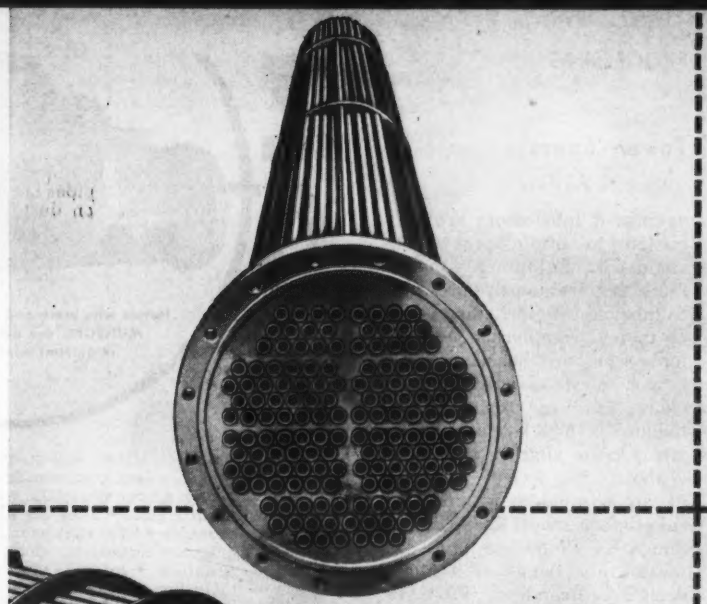
Agitator is designed to mix liquids inside drum

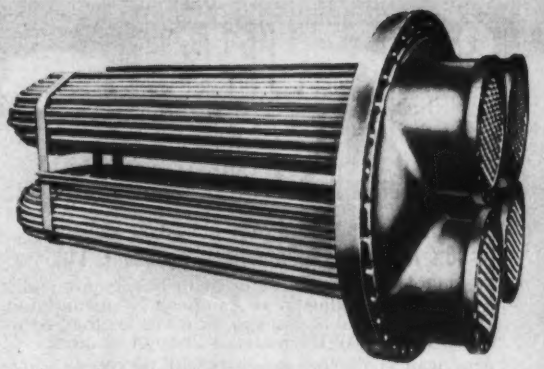
designed small-diameter mixing paddles are mounted on mixing shaft to give maximum agitating efficiency. Unit is also available with explosion-proof motor for use with flammable liquid mixtures.

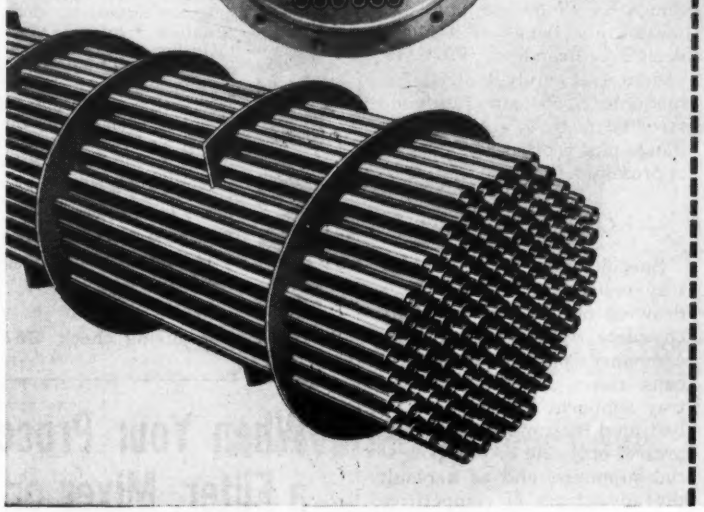
(Model A drum agitator is product of Prenco Products Inc., Dept. CP, 507 E. 10 Mile Rd., Hazel Park, Mich. Check 4754 opposite last page.)



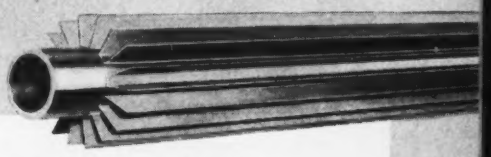
"Corrosion? Haven't been bothered with any since we built out of platinum."





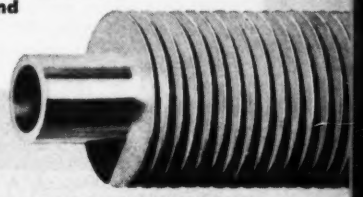


TWO GOOD WAYS TO ADD ADDITIONAL HEAT TRANSFER SURFACE AREA TO B&W CARBON STEEL ERW TUBES



(A) Longitudinal Channels Welded On

(B) Continuous Helical Fin Wound Around Tube and Welded On



TUBING REQUIREMENTS FOR HEAT TRANSFER EQUIPMENT

The economy and usefulness of pressure tubing in heat exchanger and condenser applications depend on the tubing's heat transfer ability and the ease with which it can be bent, coiled, swaged, and rolled into tube sheets.

Because of its uniform wall thickness, the heat transfer ability of B&W Electric-Resistance-Welded Carbon Steel Tubing is the optimum for such a ferrous material. It is an economical material to use, not only because of its reasonable first cost, but also because of its low fabrication cost, since ease of bending, coiling, swaging, and rolling into tube sheets is provided through quality-controlled methods used in its manufacture.

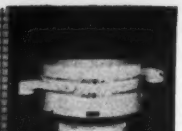
B&W Electric-Resistance-Welded Carbon Steel Heat Exchanger and Condenser Tubing is widely used in the process industries, including petroleum refining and chemical processing, and in refrigeration and steam generating equipment. If carbon steel tubing can do the job required, you will find B&W ERW Tubing provides maximum, trouble-free service life. For additional information, call on Mr. Tubes, your nearby B&W Tube Representative — *or write for Bulletin 412.* The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

TA 6099 PG-2

Seamless and welded tubular products, seamless welding fittings and forged steel flanges—in carbon, alloy, and stainless steels

For more information on product at right, specify 4755 see information request blank opposite last page.

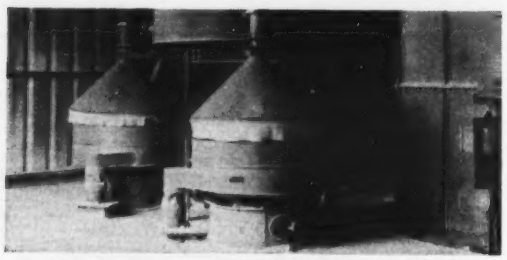
SCREENING NEWS



Six SWECO Separators Size Aluminum Silicate to 98% Accuracy for American Nepheline, Ltd.

World's largest producer of nepheline syenite (alkaline aluminum silicate) is American Nepheline, Ltd., Ontario, Canada. Sizing specifications for the product called for 98% of the material through 30 mesh.

American Nepheline ran tests with SWECO 48" diameter Separators with 26-mesh tensile bolting screen cloth (.0310" opening). Results were so impressive six



SWECO *Separators used by American Nepheline have virtually eliminated blinding.*

SWECO Separators were installed. Feed rate to each unit has averaged 4 tons per hour. Accuracy has been consistently within 98%. Screen cloth life has averaged 2,270 hours with 8,850-ton throughput.

SWECO Separators screened nepheline syenite so efficiently and economically, the company turned to SWECO again for the screening of discharge from its dust collection system to remove coarse biotite and foreign material prior to retreatment. American Nepheline needed a unit capable of treating one to two tons per hour and producing a material containing only 1 to 1.5% of plus 100 mesh. A 48" diameter SWECO Separator with 84-mesh tensile bolting screen cloth (.0084" opening) was installed to handle the desired tonnage. A duplicate unit was installed a year later.

SWECO Separators Screen 6 Products for Major Chemical Company

For fast, efficient screening of calcium carbonate, moth balls, dry catalyst, pharmaceuticals, detergent powders and sodium sulphate, one manufacturer uses 15 SWECO Vibrating Screen Separators–both single and multiple-deck, 18" and 48" diameter models. Operation of these units has been so successful, the company now plans to replace all other separators with SWECO units.

Screening Analysis and Recommendations Available

Your nearby SWECO District Engineer is available to help you with special screening problems. His "know-how" covers over 200 different materials . . . wet and dry, coarse and fine, heavy and light. He will demonstrate, in your plant, how a SWECO Separator can screen your material economically and efficiently. No obligation, of course.

A complete data file on chemical screening, plus a 22-page catalog, are yours for the asking. Write for Bulletin S-105-3.

SWECO SEPARATORS

SOUTHWESTERN ENGINEERING COMPANY
4900 Santa Fe Ave., Los Angeles 58
LUdlow 3-6262—Cable: SWECOLA

Engineers and Constructors . . . Manufacturers

When inquiring check 4756 opposite last page

Tower 'Specs'

Starts on page 178

savings if fabricators are permitted to quote on their standards. Equipment manufacturers frequently are able to fabricate these items cheaper than if commercial equivalents were purchased. For example, a standard fabricated clamp joint for main column flanges (16" size, stainless steel) costs slightly over $125—about one fourth the cost of an equivalent commercial raised-face welding neck flange. A single manhole extension and flange of standard design costs about $700. Its commercial equivalent, a 24" manhole of 304 stainless constructed from a welding neck flange plus a blind flange, costs approximately $2000.

Column Internals

Specifications for bubble-tray columns often include a drawing of the tray assembly complete with details of the component parts such as deck, caps, risers, downcomers, and tray supports. The type so illustrated may meet the standards of only one or two potential suppliers, and as a result the advantages of competitive bidding are largely lost.

Since the relative efficiencies of standard commercial bubble-tray designs do not establish one design as superior to others, it is sufficient for the purchaser to specify the number and size of caps, slot area, riser area, downcomer area, or tray facing. With this information, the equipment manufacturer can design the mechanical layout and method of tray support in conformance with his most economical techniques. The purchaser will receive quotations which meet process requirements, and which also represent the optimum design of each bidder. Giving a manufacturer the option of quoting his standard is particularly important when the fabricator is a specialist in that type and material of construction.

To insure adequacy of basic data, engineering fabricators request the purchaser to complete a standard questionnaire

MUNSON ROTARY BATCH MIXER

Here's why more and more MUNSONS are doing the important mixing jobs

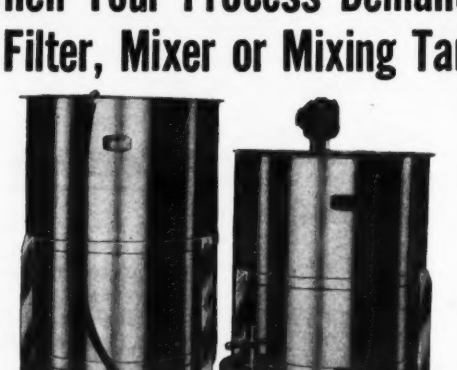
• Munson Mixers will quickly blend various chemical compounds into a homogeneous, accurate mixture, no reduction in particle sizes • They blend powders and granules • Spray pipes may be installed to spray liquids on dust and granular materials • Internal vent pipe to expel toxic fumes • Drum may be heated or cooled • Granular fertilizers can be coated with insecticide dust • Will blend chemicals, fertilizers, insecticides, herbicides, antibiotics, and many other materials • Available in several models • Low horsepower • 20 to 250 cu. ft. mixing capacity

TELL US YOUR MIXING PROBLEMS . . . write or phone for the complete story on Munson Rotary Batch Mixers.

MUNSON MILL MACHINERY COMPANY
Dept. P-757 210 Seward Ave., Utica, N.Y.

When inquiring check 4757 opposite last page

When Your Process Demands a Filter, Mixer or Mixing Tank



CHECK THE ADVANTAGES

Clip and Mail This Coupon For Complete FREE Alsop Catalog

ALSOP ENGINEERING CORPORATION
1006 West Road, Millidale, Conn.

GENTLEMEN:

Please send me FREE, your new catalog, "Liquid Processing Equipment"

Name .....
Company .....
Address .....

When inquiring check 4758 opposite last page

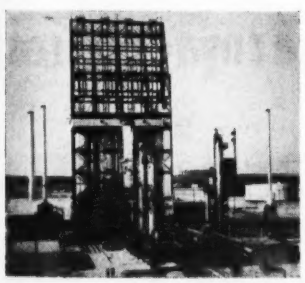
form. This includes all necessary process, operating, and cost data and even vapor-liquid equilibria information for unusual systems. Once this is supplied, design calculations can be made on standard forms. Whenever possible, final design is checked with operating data from actual installations. ■

Compact freeze-dryer

Portable, compact unit for freeze-drying is described in 18-page catalog on research equipment. Features, dimensions, and prices are listed. "Research Equipment" — Will Corp., Dept. CP, Rochester 3, N.Y. Check 4759.

Big delayed coking unit handles heavy charge

In continuous operation at Yorktown, Va., refinery of American Oil Company, delayed coking unit is reported to be one of largest ever designed. The four-coke-drum unit produces gasoline, light and heavy gas oils, and 600 tons of coke daily.



Large coker unit produces 600 tons coke daily

Standard feed stock to unit is vacuum reduced crude with 25% Conradson Carbon, API gravity of 6.1%, and SFS viscosity of 6000 at 210°F. Unit permits processing of variety of feed stocks at various recycle ratios.

(Delayed coking units was designed and engineered by The Lummus Company, Dept. CP, 385 Madison Ave., New York, N.Y.)

Eimco Burwells SAVE TIME

Recovering Yellow Cake

Two **Eimco Burwell Filters** recover and wash uranium precipitate before it goes to a rotary dryer in an acid leach flowsheet that produces yellow cake (magnesium ammonium diurinate).

Uranium rich eluate is precipitated with magnesium oxide and ammonia in a 20,000 gallon batch operation and pumped to settling tanks. Clear supernatent is decanted to waste and pulp is pumped to the 2" x 26", 10 - frame Eimco Burwells at 50 psi.

In this critical assignment, the Eimco-Burwells **recover precipitate in a very short cycle time** (1 hour, 15 minutes, start to start). During the cycle, precipitate is **washed to specification in 20 minutes.** Filtrate losses are **less than 15 ppm.**

The homogeneous split cakes formed on these Eimco-Burwells provide this firm with a high flow rate during the entire cycle because **effective filtrate area is not seriously reduced** as filling progresses. This cake formation also eliminates channeling and short circuiting.

Washing occurs through half a cake thickness... permits **maximum removal of soluble values with a minimum wash volume.**

One set of frames is filtering while the other is cleaning; thus, **cleaning downtime is negligible.** High mechanical operating efficiency of frames and filters **sharply reduce** labor, maintenance and filter medium costs.

Eimco vacuum and pressure filters provide users operating and production advantages in many phases of uranium flowsheets as well as in a wide variety of other chemical and metallurgical processes.

Write today for detailed information or arrange to have an Eimco field engineer help you with your process problems.

THE EIMCO CORPORATION

SALT LAKE CITY, UTAH

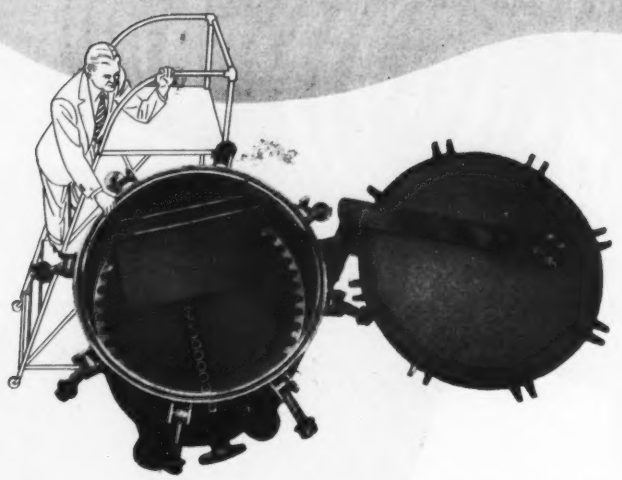
Research and Development Division, Palatine, Illinois • Process Engineers Inc. Division, San Mateo, California
Export Offices: Eimco Building, 51-52 South Street, New York 5, N. Y.
BRANCHES AND DEALERS IN PRINCIPAL CITIES THROUGHOUT THE WORLD

EIMCO ®

B-896

When inquiring check 4761 opposite last page

HOW TO INCREASE the buying power of your filter dollar



Take a close look inside a Niagara Filter on the job and you'll see why it's your biggest dollar's worth. Look at its sturdy construction. Ask a user how long a Niagara Filter lasts . . . how little it costs per year. You'll find a Niagara lasts up to three times as long as a filter without this rugged construction and efficient design. So, your Niagara dollar buys *more*.

GET NAMES, DATA

Niagara FILTERS

A DIVISION OF

American Machine and Metals, Inc.

Dept. CP-757, EAST MOLINE, ILLINOIS

(Niagara Filters Europe: Kwakelpad 28, Alkmaar, Holland)

☐ Send me names of Niagara users nearby.
☐ Send complete data on Niagara Filters for filtering.

NAME AND TITLE

COMPANY

ADDRESS

CITY ZONE STATE

SPECIALISTS IN LIQUID SOLIDS SEPARATION

When inquiring check 4762 opposite last page

Operator Anthony Mason checks manometer reading on unusual pilot plant made entirely of stainless steel

Built to Lakeside Laboratories' specifications, one of latest developments in pilot plants is a stainless steel unit that . . .

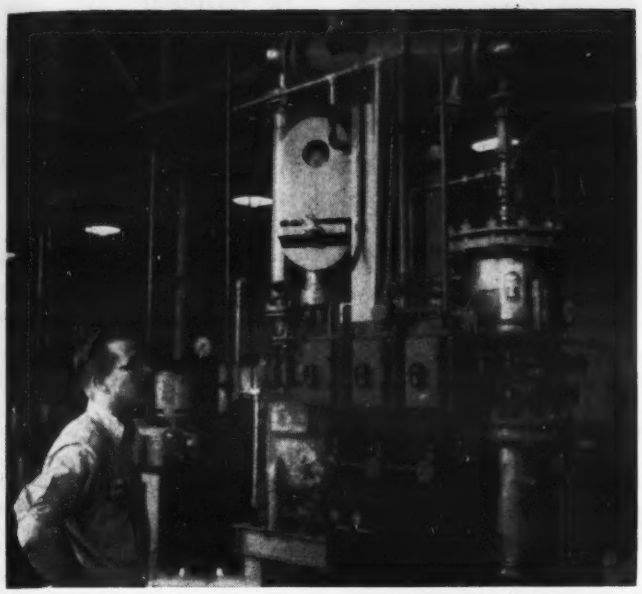
performs virtually all in pharmaceutical che

WILLIAM C. CLARKE, Assistant Editor
JOSEPH N. JACQUES, Plant Engineer
Lakeside Laboratories
Milwaukee, Wisconsin

Problem: Besides requiring vacuum conditions with low temperatures to produce antispasmodic intermediates, Lakeside Laboratories in Milwaukee, Wisconsin, also found that contact with some common metals will produce a slight discolorization, or yellowing. Even a slight discoloring of product would make its rejection necessary.

Solution: Based on its own specifications, Lakeside asked that an unusual pilot plant assembly be developed by a reactor manufacturer. Made entirely of 316 stainless steel, pilot plant will handle most of the organics used in Lakeside's products. Unique set-up consists of a ten-gallon reactor, a three-gallon decanter, a 15 square foot single-pass condenser, and a five-gallon receiver.

Built to ASME Code U-69, unit can handle vacuum distillations as low as 50 microns hg absolute pressure. Internal



CP Staff Photos

Complete pilot plant is set up in portion of laboratory. Unique setup consists of ten-gallon reactor, a three-gallon decanter, a single-pass condenser, and a five-gallon receiver. "Jack-of-all-needs" pilot unit will handle nearly all plant operations in pharmaceutical chemistry

all pilot operations chemistry

pressure on the pot still can go to 60 psi, jacket pressure to 75 psi with 30 inches internal vacuum. Complete unit requires only a four foot by 30 inch floor area and is only nine feet high.

Pull-down to operating vacuum conditions requires only a few minutes. A 14½ cfm vacuum pump is used. Pilot plant has been so designed that vertical column can be removed and packed for operation as a packed distilling column. All-stainless double rotary seals are used.

Used for preparation of N-ethyl - 3 - hydroxypiperidene, Lakeside Laboratories also plans to use the equipment for small-scale production lots as well as pilot plant operations.

Results: Although Lakeside Laboratories has had the unit in operation only a short time, laboratory personnel have found the equipment to be fast, versatile, and easy to manipulate. High vacum operation is possible without difficulty under conditions necessary for the required organic syntheses. Personnel have found that virtually all pilot plant operations in pharmaceutical chemistry can be performed in the single compact assembly.

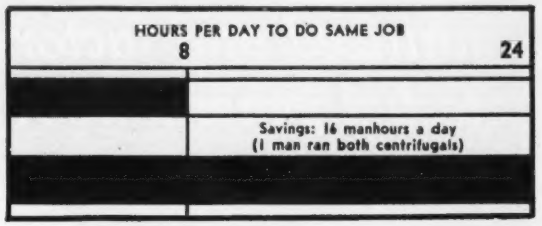
(Pilot plant assembly is product of The Pfaudler Company, Dept. CP, Rochester 3, New York . . . or for more information check 4763 on form opposite last page.)

ONE

Tolhurst

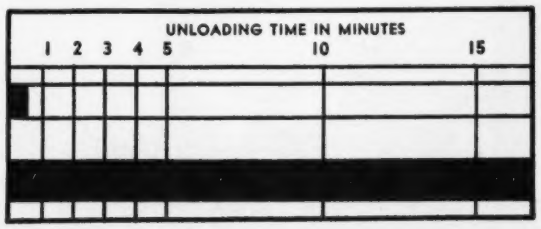
centrifugal saves 16 manhours a day

A Tolhurst Batch-Master centrifugal is now processing the same volume of fine organics in 8 hours as 2 other centrifugals formerly did in 24 hours. These results, illustrated graphically, occurred in a leading chemical plant.


HOURS PER DAY TO DO SAME JOB
8
24
Tolhurst Batch-Master
Savings: 16 manhours a day (1 man ran both centrifugals)
2 former centrifugals

Unloads in 30 seconds

Tolhurst's hydraulic unloader and bottom discharge unload the solids in 30 seconds. Other batch centrifugals, under identical conditions, take 15 minutes or more.


UNLOADING TIME IN MINUTES
1 2 3 4 5 10 15
Batch-Master with hydraulic unloader
Other batch centrifugal with manual unloading

MAIL COUPON TODAY

Tolhurst CENTRIFUGALS

A DIVISION OF

American Machine and Metals, Inc.

Specialists in liquid-solids separation

Dept. CPT-757, EAST MOLINE, ILLINOIS

Send your new free 4-page Bulletin TC-14-56 giving full data on Batch-Master Centrifugal.

NAME AND TITLE

COMPANY

ADDRESS

CITY ZONE STATE

When inquiring check 4764 opposite last page

Only Gas Atmospheres Delivers completely unitized and factory tested generators . . . .

The second of two 20,000 c/h food purity nitrogen generator systems, includes generator through purification — drying and compressing to 250 lbs. on a common base.

341

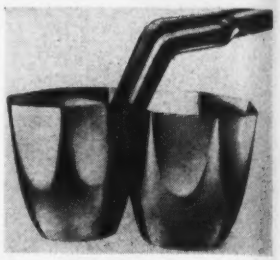
gas Atmospheres, inc

equipment for producing industrial gases

20011 WEST LAKE ROAD CLEVELAND 16, OHIO

Crucible is shaped for versatility

High-purity platinum for chemical stability



Two polygon-shaped crucibles are picked up with tongs, flat side to flat side

Uses: As laboratory crucible for analytical work requiring laboratory ware of high-purity platinum.

Features: Platinum crucibles are polygon-shaped for versatility.

Description: Flat sides of polygon extend only three-quarters down on crucible with lower part tapered and

Pouring is easier with corner spouts of crucible

circular in shape. Crucible has a flat bottom. Crucibles are made from platinum from which certain trace elements have been removed. Result is a crucible that is highly stable chemically.

Advantages

Crucible can be picked up with tongs more easily. In pouring, polygon shape provides a corner spout opposite each flat side. Two hot crucibles, flat side to flat side, can be picked up at one time. Crucibles also have additional

When inquiring check 4765 opposite last page

stability when a number of them stand together, flat side to flat side.

(Polygon crucibles are product of Baker and Company, Inc., Dept. CP, 113 Astor St., Newark, N.J. . . . or for more information check 4766 on form opposite last page.)

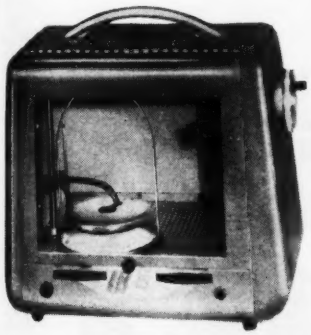
Determines moisture directly in percent automatically

Weighs sample; preserves moisture result

Uses: Determining percent moisture on any material that can be safely dried by infrared element.

Features: Balance automatically weighs sample after, and preserves moisture result on counter.

Description: Instrument is motor-driven torsion balance



Motor-driven torsion balance determines percent moisture automatically

with built-in infrared metallic heating element. Also has a self-contained timer and a variable heat control between 30 and 600 watts. Operator need only load pan and set time. Percent moisture is determined and appears on counter.

(I-R Moisture-Matic balance is available from Scientific Products, Div. of American Hospital Supply Corp., Dept. CP, 2020 Ridge Ave., Evanston, Ill. . . . or for more information check 4767 on the convenient Reader Service slip opposite last page.)

Controlled dispersion for better blends

If you're coating a fine, dry material; blending liquids into a dry powder . . . or dispersing a small amount of one material into another you need more than a simple stirring, tumbling or agitating action to achieve the desired results.

In the Simpson Mix-Muller a *three-way* kneading, smearing, spatulate action actually coats one material with another—rather than placing them *next* to each other. Agglomerates are broken up, moisture or binder dispersion is thorough. You get an intensive, homogenous mix that *stays* mixed and will not segregate in storage or transit. Want proof? Write for details on a confidential test. See what *mulling* can do and remember . . .

MIXING IS OUR BUSINESS

SIMPSON *MIX-MULLER*® DIVISION

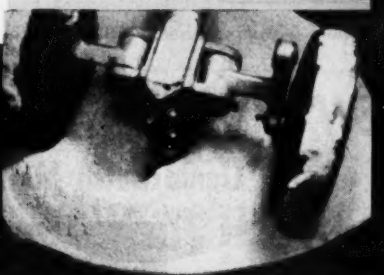
National Engineering Company

640 Machinery Hall Building • Chicago, Illinois

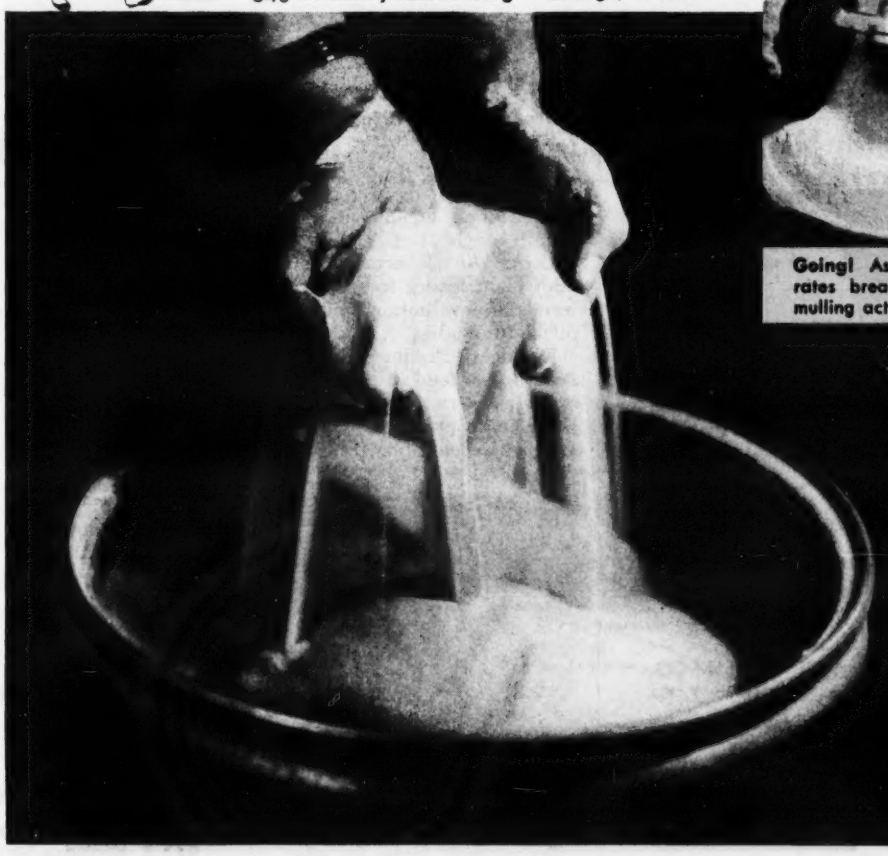
3 WAY ACTION saves time and reprocessing

Mix is wetted; dispersion of coating media begins.

As mulling proceeds, mix begins to "lump" up as moisture is dissipated.



Going! As material drys agglomerates break down under intensive mulling action.



Gone! Components are thoroughly blended. Mix is uniform, smooth flowing . . . quickly achieved.

WRITE FOR Bulletin on *Mulling for the Chemical and Process Industry.*

When inquiring check 4768 opposite last page

TAKE GUESSWORK OUT of DEW POINT READING with Alnor® DEWPOINTER

Any shop man can quickly...accurately...read dew points with the Dewpointer. It is the only instrument that lets you see the fog in a sealed chamber under controlled conditions. Compare this fast, positive method with attempts made to tell exactly when fog forms on a mirrored surface. Completely self-contained, requires no external coolant or auxiliary apparatus ...operates on enclosed battery or AC. Available in three ranges for dew points between −20° F. and room temperature, from −80° to 0° F. and −80° F. to room temperature.

Send for Dewpointer bulletin. Tear out this ad and send on your letterhead to: Illinois Testing Laboratories, Inc., Room 504, 420 N. LaSalle St., Chicago 10, Ill.

Alnor PRECISION INSTRUMENTS FOR EVERY INDUSTRY

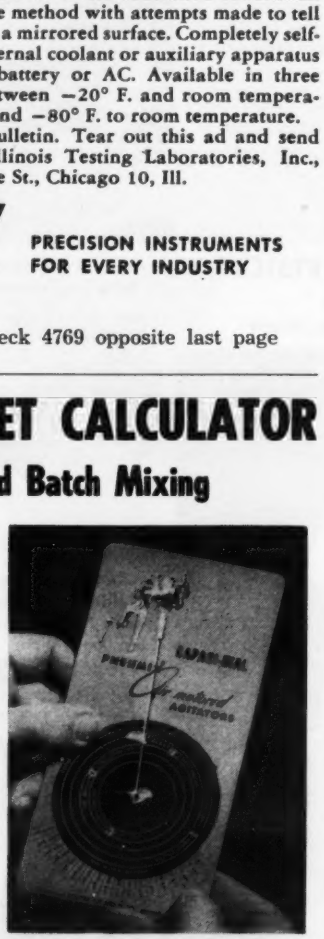
When inquiring check 4769 opposite last page

NEW POCKET CALCULATOR

For Liquid Batch Mixing

CAPACI-DIAL for PNEUMIX AGITATORS

Simply turn the pointer to the particular volume and consistency of your batch. The selector automatically tells the best size Pneumix Agitator to do your mixing.



The attached coupon will get you one without obligation.

ECLIPSE AIR BRUSH CO.
308 Park Ave. Newark 7, N.J.

Please send free CAPACI-DIAL to:

Name .....

Company .....

Address .....

When inquiring check 4770 opposite last page

Among new looks . . .

. . . for reagent chemicals is spun aluminum container. Reagent-grade hydrogen peroxide is now packed in unbreakable ICC-approved spun aluminum bottle. Seamless can is protected against pressure blow-out by precision-thread screw cap with plastic safety valve.

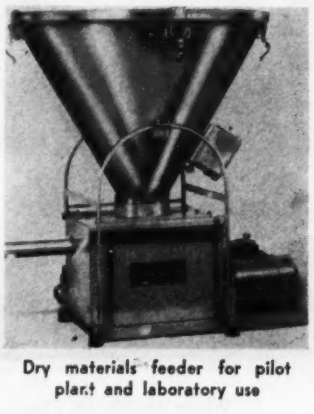
(Hydrogen peroxide in aluminum container is product of Fisher Scientific Company, Dept. CP, 717 Forbes Street, Pittsburgh 19, Pa. Check 4771 on form opposite last page.)

Meters dry material for pilot tests

Has same accuracy as production equipment

Uses: As laboratory and pilot plant feeder for dry materials in evaluation and application studies.

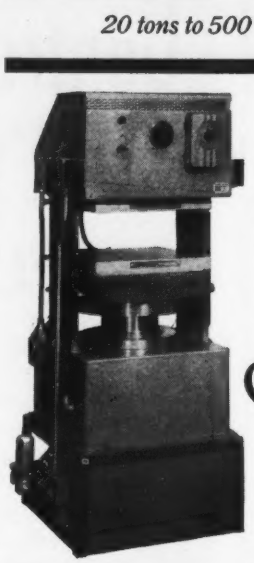
Features: Feeder has same accuracy of feed as production screw feeders. Feed rate can be varied approximately 100 to 1 through variable transmission.



Dry materials feeder for pilot plant and laboratory use

HYDRAULIC PRESSES

20 tons to 500 tons ram pressure



Platen area 8 to 24 inches

Motorized hydraulic system

Controlled platen temperatures to 600° F

Automatic time cycler

Customized to your requirements

Φ **PHI PRESS** *formerly Preco*

Write for circular or if you prefer we'll have our nearest representative call on you...

Pasadena Hydraulics, Inc., 1433 Lidcombe, El Monte, Calif.

When inquiring check 4772 opposite last page

MAGNETIC SEPARATION

Model T-20 Magnetic Separator. A small machine for a quick evaluation.

Model T-25 Magnetic Separator. The ultimate laboratory equipment for results directly comparable with commercial models.

Laboratory Equipment for Accurately Evaluating the Feasability of Magnetic Separation for Quality or Yield.

Exolon High Intensity Magnetic Separators flow material onto a magnetized rotor. Particles influenced by magnetism, cling to the rotor longer than non-magnetic particles. Knife dividers complete the separations.

Write for Literature

THE EXOLON COMPANY
947 E. Niagara Street Tonawanda, N. Y.

When inquiring check 4773 opposite last page

Description: Pilot plant feeder operates with unit mounted on vibrator so that screw, screw tube, screw trough, and screw bearings vibrate as one assembly, while screw rotates. Vibration serves to fluidize dry material. Screw meters it out discharge end of tube in proportion to speed of screw rotation.

Abrasion wear is reduced because material bounces along vibrated surfaces of trough, screw, and tube. Fine powders, flakes, and pellets can be handled by unit without bridging or flooding. Accuracy is said to be ±1% deviation.

(Further information on Vibra Screw pilot feeder is available on company letterhead from Vibra Screw, Dept. CP, P. O. Box 62, Williston Park, N.Y.)

Line of pressure gages

Dial indicating and recording pressure and vacuum gages are described in 32-page catalog. Specifications and prices for the redesigned standard, heavy-duty, and extra-heavy-duty gages are listed. Cat 525A — Weksler Thermometer Corp., Dept. CP, 195 E. Merrick Rd., Freeport, Long Island, N.Y. Check 4774.

"Make me some salt, will ya, Charlie?"

Idea submitted by Joe McVene, Solvay Process Div., Allied Chemical & Dye Corp., Solvay, N.Y.

Sam Spinner's Mail Box

by Sam Spinner

Case #1: A Gelatinous substance from an adhesive in waste water was causing objectionable odors in a waste pond. The method of controlling these odors by spraying was costly, time consuming and offered only temporary relief.

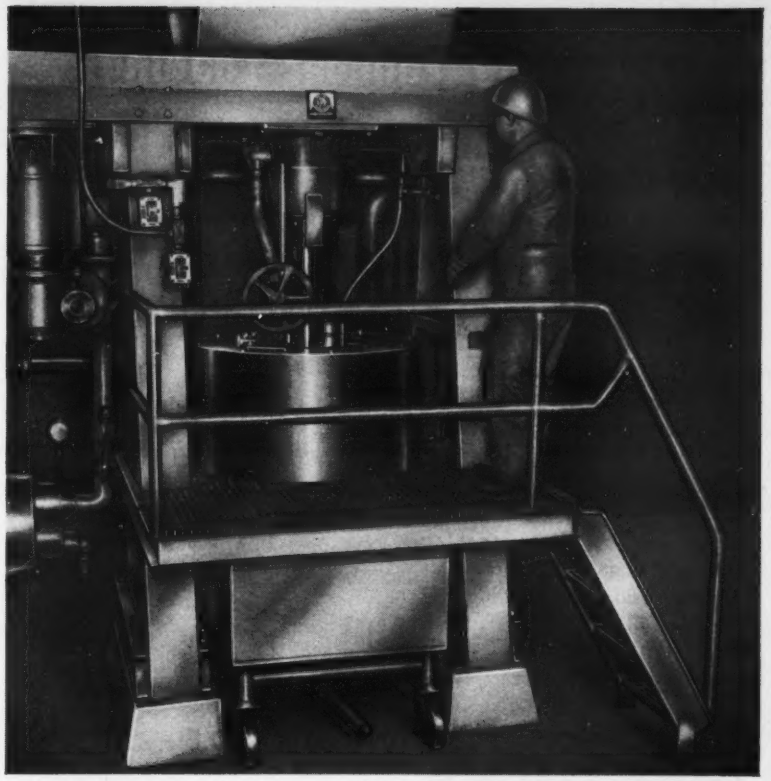
Solution: An AT&M Imperforate Basket separated the Gelatin from the wash water, concentrating it so that the machine required cleaning out only once every 8 hours by the AT&M Unloading Drive and Plow.

Case #2: A bulky product, that required careful handling, had to be packed in bags before placing in an extractor to spin off the excess moisture. The bags were then lifted out of the machine after the extraction and emptied. A slow, expensive and back breaking operation.

Solution: AT&M designed a machine that handled the product without the use of bags, weighing each load before gently loading the basket at 20 rpm through AT&M's Slow Speed Loading Drive. After extraction, the basket was unloaded on to a conveyor by AT&M's latest type bottom discharge basket that does not require a plow. The above cycle was automatically timed throughout, eliminated the need of an operator, and handled the product more gently than by the previous method.

Case #3: Clarification of a liquid required high speed and production demands necessitated a fast rate of feed. These two factors combined to give an additional problem of foaming.

Solution: AT&M built a high speed machine with an extra deep basket that provided a longer retaining time and gave the clarification required at the fast rate of feed. The addition of a fume tight cover and special venting of the outlet pipe overcame the problem of excessive foaming.



AT&M specially engineered this suspended centrifugal for use in the purification of sodium borohydride at the Metal Hydrides, Inc. plant in Beverly, Massachusetts.

How Metal Hydrides, Inc. solves a centrifugal problem

The AT&M centrifugal shown above is AT&M's Model V 32. Its basket capacity is four cubic feet. It is easily loaded from the top and features explosion-proof motors.

If you have a separating problem, AT&M can set up a mobile laboratory in your plant to determine on the spot whether an AT&M centrifugal can solve it.

Safe, space-saving AT&M centrifugals are widely used in Separation, Dehydration, Coating, Filtering, Impregnation and Sedimentation processes. Send coupon for full data.

AMERICAN TOOL & MACHINE COMPANY
1423 Hyde Park Ave., Boston 36, Mass.
Please send me my free copy of the new AT&M booklet "Centrifugal Force." I am interested in the following processes:
Separation ☐ Extraction ☐ Dehydration ☐ Clarification ☐ Coating ☐ Filtration ☐ Draining ☐ Thickening ☐ Impregnation ☐ Sedimentation ☐

SAVE TIME, SPACE AND COSTS WITH
A.T.and M.
CENTRIFUGING

Name.....Title.....
Company.....
Street.....
City.....Zone....State .....

When inquiring check 4775 opposite last page

For Every Tankcar Loading or Unloading Situation A NECO SAFETY PLATFORM

OUTSIDE

Handling vinyl acetate monomer at Air Reduction Chemical Company, Calvert City, Kentucky. This NECO 2A platform can be turned manually — has retractable deck and stainless steel piping, automatic foot brake and explosion proof lighting fixtures.

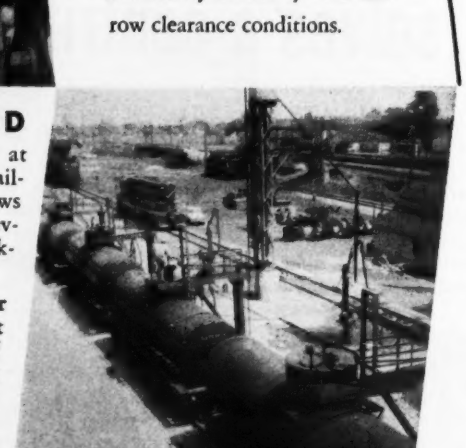
INSIDE

Unloading liquified paraffin at Kalamazoo Vegetable Parchment Company, Kalamazoo, Michigan. This NECO 3NT platform can be raised or lowered hydraulically—fits narrow clearance conditions.

ALL AROUND

Unloading diesel fuel at Chesapeake and Ohio Railway, Detroit, Mich. Shows orderly arrangement of several NECO 2A Safety Tankcar Platforms.

For greater safety, higher morale and more efficient loading and unloading of any type of liquids — let the Nichols Safety Tankcar Platform serve your company. Get full details today.



NICHOLS ENGINEERING CO.

3816 W. GRAND AVE., CHICAGO 51, ILLINOIS

SERVING INDUSTRY SINCE 1894

When inquiring check 4776 opposite last page

Ray George, Senior Maintenance Engineer at Westvaco, uses plastic helmet and goggles for protection when going to various plant areas

Westvaco goes to plastic helmet for improved safety and comfort

Used along with vinyl acid goggles, which offer complete protection — yet are soft and easy to wear

GORDON WEYERMULLER, Associate Editor
With **H. E. WEBB,** Safety Supervisor
Westvaco Chlor-Alkali Div.,
Food Machinery & Chemical Corporation
South Charleston, West Virginia

At the Westvaco plant in South Charleston, West Virginia — where caustic, chlorine, and other heavy chemicals are produced — plastic helmets reinforced with glass fiber are increasingly being used by the more than 1000 employes at the plant. One reason this type helmet is being adopted is that it is non-conductive to electricity. If a man's head ever should come close to a power line, this factor could be quite important.

Another advantage found for this type of hat is that it will not cut or lacerate anyone on the ground if it should be knocked off someone's head higher up. Helmet is non-flammable, has high impact resistance, and is not affected by acids, alkalis, or solvents. Three ribs across the crown give it extra strength with added protection against overhead blows. Temperatures from −50 to +300°F do not affect shape, color, or protective characteristics. Another advantage of the hat is that it is cool in the summer. It is comfortable and can be adjusted to head size.

At Westvaco, hats are safety coded — safety personnel wear green helmets, fire patrol wears red helmets, and remainder of plant personnel use white helmets.

Along with the plastic helmets, Westvaco uses lightweight plastic acid goggles, which have been found to be comfortable as well as safe. Frames are vinyl plastic and lens is a special formula of optical plastic. Non-corrosive metal hoods over fine-mesh

screen vents offer full protection from splashes and ample ventilation to prevent fogging. At Westvaco, yellow has been adopted as the standard color for the goggles.

("Hard boiled" plastic helmets are product of E. D. Bullard Co., Dept. CP, 2680 Bridgeway St., Sausalito, Calif. . . . or check 4777 on form opposite last page.)

(Saf-I-Chem goggles are product of United States Safety Service Co., Dept. CP, 1215 McGee St., Kansas City 6, Mo. . . . or check 4778 on form opposite last page.)

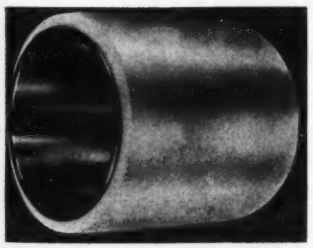
Stainless steel flask gives more safety, better insulation

Flask is implosion-proof

Uses: For dry ice and solvent bath, liquid nitrogen or liquid air bath, or wherever required.

Features: Implosion-proof flask is reported to provide insulating qualities superior to conventional flasks.

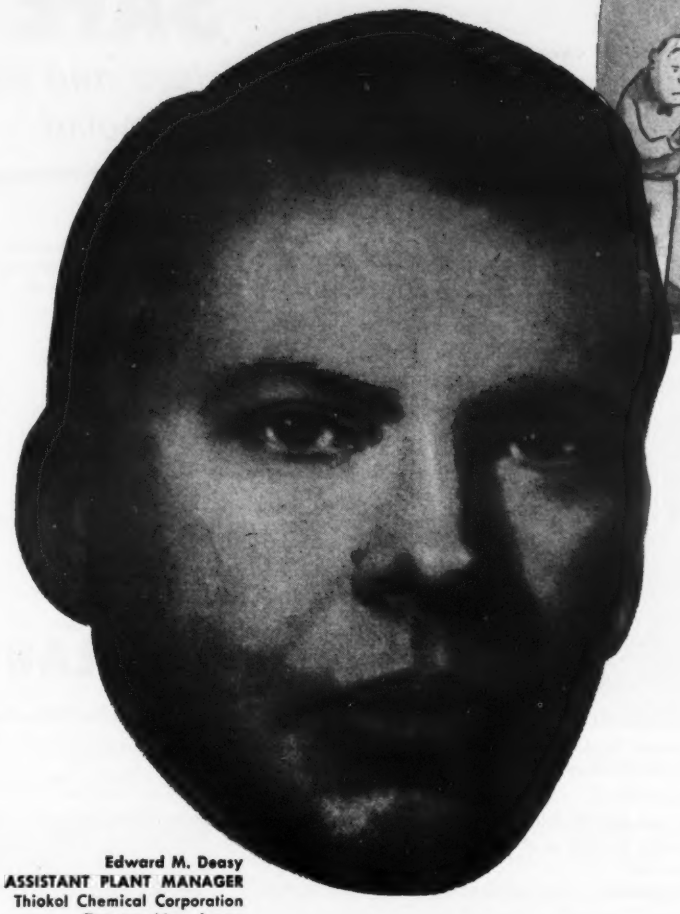
Description: Insulated stainless steel flask utilizes lightweight, rigid, closed-cell plastic that is resistant to acids,



Stainless steel flask provides greater personnel safety

alkalis, and all common organic solvents. Containers require no future re-evacuation and are constant in their insulation values. Wide mouth design permits easier handling of fluids. Flasks are available in capacities of 2, 4, 8 liters.

(Insul-Steel container is product of E. Machlett & Son, Dept. CP, 220 E. 23rd St., New York 10, N. Y. Check 4779 on form opposite last page.)



Edward M. Deasy
ASSISTANT PLANT MANAGER
Thiokol Chemical Corporation
Trenton, New Jersey

"Doc, dermatitis control is simple as 1-2-3-4-5."

An exaggeration?

Not at all. Occupational skin irritation can be prevented. Simply. At surprisingly little cost.

— with the WEST Dermatitis Prevention and Control Program that:

1—insures personal cleanliness
2—protects exposed skin areas
3—prevents clothing contamination
4—guards against special hazards
5—provides continuous consultation.

THE WEST Program is based on individual shop requirements. It can save hundreds, perhaps thousands, of dollars each year by eliminating medical treatment, enforced idleness, lowered morale, production lags.

"We controlled dermatitis with West's Program"

"Dermatitis no longer troubles our plant employees — now that we're using West's Program of Prevention and Control," says EDWARD M. DEASY, Assistant Plant Manager, Thiokol Chemical Corporation, Trenton, New Jersey.

"At the suggestion of the West Representative, our program includes LAN-O-KLEEN Hand Cleaner to insure personal cleanliness and ANTISEPTIC PROTECTIVE CREAMS to protect exposed skin areas. Since these products have been in use, outbreaks of skin irritations have ceased altogether."

Would similar results interest you? Send the coupon.

LARGEST COMPANY OF ITS KIND IN THE WORLD

WEST DISINFECTING Company

WEST DISINFECTING COMPANY, 42-16 West Street, Long Island City 1, N. Y.
Branches in principal cities • In Canada: 5621-23 Casgrain Avenue, Montreal
☐ Please send your 24 page booklet "The Control of Dermatitis in Industry."
☐ Please have a West representative telephone for an appointment.

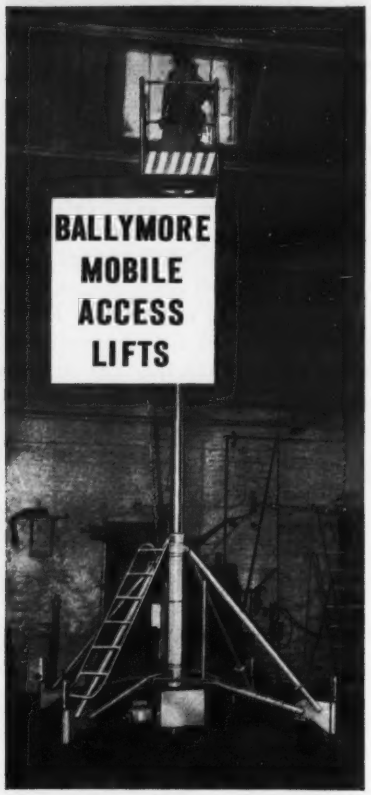
Name.....

Position.....

Mail this coupon with your letterhead to Dept. 24

When inquiring check 4780 opposite last page

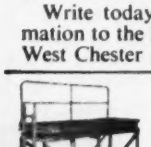
NEW METHODS FOR REACHING HIGH PLACES SAFELY...



For working easily and safely at levels up to 40 feet above the floor, there's nothing like Ballymore Mobile Access Lifts. These power platform lifts are readily portable and, by using levelizing jacks, maintain a steady, firm position at any location. When folded, the lifts pass through narrow openings, into and out of elevators.

A push-button switch on the guardrail gives the user complete control of the lift. Used indoors and out for an almost endless variety of jobs. Six different models available for maximum reaches of 19 to 42 feet.

Write today for complete information to the Ballymore Company, West Chester 10, Pa.



HYDRAULIC LIFT WORK PLATFORM

Another Safety Product by Ballymore. Designed for safe use at levels between 7 and 20 feet. Can accommodate up to 3 men. Portable, flexible, safe. Write for details.

LOOK FOR THIS LABEL TO BE SURE IT'S THE BEST! BALLYMORE COMPANY WEST CHESTER PA Ballymore

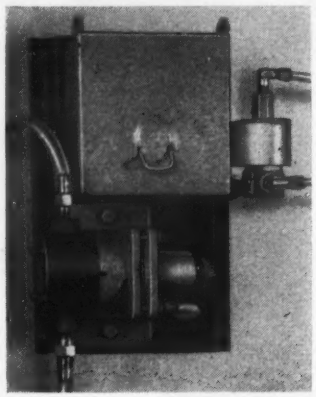
When inquiring check 4781 opposite last page

SAFETY

Meters acids, chemicals safely from carboys, other containers

Uses: Transferring acids and other chemicals directly from carboys and drums to give increased safety in handling these materials.

Features: Pumping rates, from 0.8 to 8.0 gallons per 24 hours, are adjustable by varying stroke length and stroking frequencies.



Diaphragm feeder meters acids directly from carboy

Description: Unit comes in complete package including suction and discharge tubing, foot valve, and operating tubing. Operation is either pneumatic or hydraulic. Feeder may be mounted on wall with suction tube going directly into carboy underneath.

(Model 19130 Proportioneer Feeder is manufactured by Proportioneers, Inc., a division of B-I-F Industries, Inc., Dept. CP, Providence, R.I. . . . or for more information check 4782 on form opposite last page.)

Oxygen-inhalator kit is portable

Compact apparatus contains half-hour oxygen supply

Uses: Uncomplicated, effective means of administering oxygen for first-aid purposes. Suitable as "in-the-plant" first-aid equipment.

Features: Apparatus is light and compact enough to be used

SAFE
moisture and fume removal

Three outstanding features make Air-Van Power Exhausters especially suited for exhausting moisture and corrosive fumes.

Direct Drive 150 to 11,000 CFM. S.P. to 4".

Belt Drive 3,000 to 65,000 CFM. S.P. to 4".

- A patented scroll design assures positive air removal. Gallaher Air-Vans are designed to handle up to 65,000 CFM at static pressures to 4".
- The motor is out of the air stream.
- A patented air seal-off protects the motor by creating a constant curtain of fresh air around the motor shaft. This prevents any fumes from entering the motor housing.
- Other Air-Van features include quiet operation, low silhouette, weatherproof design, availability in special metals and finishes and certified ratings based on actual physical tests.

Patents 2188741 2526290
Patents pending

The GALLAHER Company

4108 Dodge Street Omaha, Nebraska
Export Office: 306 Paul Bldg., Utica 2, N.Y. Cable "Kaiserquip"

When inquiring check 4783 opposite last page

NEW . . .
IMPROVED . . .
dustex collector

. . . solves more recovery problems and assures peak efficiency

NOW, a major design improvement on the widely used and highly regarded DUSTEX Collector means bigger returns on your investment.

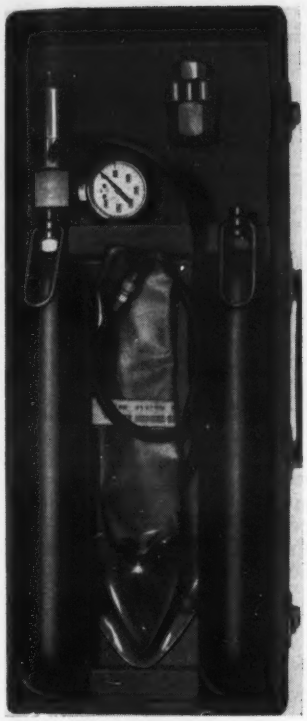
ALL NEW TUBE DESIGN — Longer, larger *cast* tube produces the following results . . .

- **Greater capacity with less air flow resistance**
- **Higher abrasion resistance**
- **Ability to handle inherently sticky materials**
- **Self-cleaning action**
- **Highest efficiency ever**

ALREADY PROVEN in numerous field tests on the most difficult dusts, the new improved DUSTEX Collector is ready to go to work for you now. Write for descriptive literature and details today.

P. O. BOX 2520 DUSTEX CORP. BUFFALO 25, N. Y.

When inquiring check 4784 opposite last page



Oxygen inhalator comes in lightweight, compact kit with two "half-hour supply" cylinders

on patient while he's being carried on stretcher.

Description: Included in kit are plastic facepiece and breathing bag; oxygen diluter; four feet of hose; cylinder adapter that permits small cylinders to be refilled from large commercial cylinder; and approved pressure regulator.

(Oxygen inhalator is manufactured by Safety Division, Davis Emergency Equipment Co., Inc., Dept. CP, 45 Halleck Street, Newark 4, N.J. Check 4785 on form opposite last page.)

Pocket-size safety manual

Compact, pocket-size, illustrated manual of 56 pages covers accident prevention, first aid, fire prevention, and safety equipment in laboratory. Sections on handling radioactive materials, and use of isolation units for hazardous microbiological and clinical procedures, as well as safety bibliography, are included. Bul FS 201 — Fisher Scientific Co., Dept. CP, 303 Fisher Bldg., Pittsburgh 19, Pa. Check 4786.

At last, authoritative research shows the way to

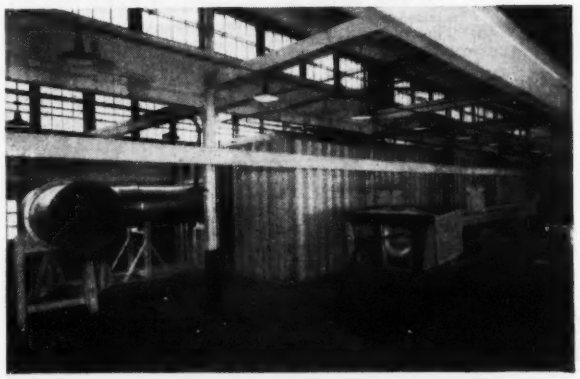
Predict and Reduce Fan Noise!

DeBothezat now offers this new 50 page book on noise control . . . anyone can use it to predict and reduce ventilating fan noise in every installation.

YOU NEED this new book, "Controlling Ventilation Noises," if you ever have *anything* to do with specifying or installing fans. This book simplifies the unfamiliar, specialized terminology of the acoustical engineer — as well as the methods for solving noise problems — so that the entire data can be put to practical use in the plant. It covers installations indoors as well as outdoors.

This data is entirely new. Nothing like it has ever before been available to the industry. The book is a result of noise control research recently completed by the acoustics staff of the Armour Research Foundation of Illinois Institute of Technology.

DeBothezat Centrifugal Roof Ventilator undergoing standard noise source calibration tests at Armour Research Foundation's acoustical laboratories.



Exterior view air outlet end of DeBothezat noise evaluation reverberation test rooms. Mock-up engine cooling test equipment in the foreground.

To supplement the research performed at Armour Research Foundation, which was sponsored by the DeBothezat Fans Division, DeBothezat has constructed its own noise-evaluation laboratories. These include reverberation rooms designed and calibrated for DeBothezat by Armour.

The entire noise evaluation project was sponsored by DeBothezat as a contribution to industry. It was accomplished at a cost of over $20,000 including the research at Armour and the facilities installed in DeBothezat's laboratories.

DeBothezat's facilities are now being used (1) to *obtain* accurate sound-output data on fan units, (2) to *develop* new fans with lower noise levels, and (3) to allow *publishing* of reliable sound-output data. In fact, DeBothezat fans are now rated for noise on both the inlet and outlet sides. These ratings are expressed in decibels and give the average sound pressure levels in each of 8 octave bands of frequencies, measured separately. This information is available on *all* DeBothezat fan units. They are the only fan units in the industry so rated.

The helpful 50-page book "Controlling Ventilation Noises," is available for just $2.00 prepaid to help defray costs of printing and handling. With it, anyone can predict and reduce ventilating fan noise in every installation. Request your copy on your business letterhead and attach check or two one-dollar bills.

De Bothezat FANS
A DIVISION OF
American Machine and Metals, Inc.
Dept. CP-757, EAST MOLINE, ILLINOIS

When inquiring check 4787 opposite last page

An Imperative Need

Lower Merion had every reason to be grateful to Philadelphia for its assistance at the Autocar fire last week . . . and ultimately it may be grateful for more than the immediate aid given during the fire. The whole Main Line may eventually owe the Philadelphia fire department a permanent debt of gratitude for introducing it to the "Giant Deluge" type of fire hose and pumper, and for opening local eyes to the unquestionable need for an equivalent piece of apparatus out here.

Eye witnesses credit the Giant Deluge (which was developed by the Philadelphia fire department and can pour 2000 gallons of water a minute on a fire from a distance of 300 feet) with preventing the spread of the Autocar fire to the adjoining business district. Many observers are convinced that the Giant Deluge turned the tide at a point when the fire, which had a good headstart, could have turned into a holocaust.

Whether this was actually the case or not will never be known. But there can be no doubt about the fact that a community like the Main Line, with its clustered commercial districts and large apartment buildings, needs something like the Giant Deluge. How one can be obtained we do not know at the moment. But the Times has been sufficiently impressed by it to pledge all-out support to any serious effort to make a similar piece of equipment available to the Main Line's fire companies.

INTELLI-GIANT TURNS THE TIDE AT MAJOR AUTOCAR FIRE!

Rushed from nearby Philadelphia, the SS-99, equipped with a Chiksan Intelli-Giant, was pressed into immediate service at the Autocar fire. Shifting wind-swept flames threatened to destroy the eastern end of the Autocar Building and nearby businesses. Within minutes after the torrent from the Intelli-Giant was directed on that area of the building, the flames were smothered and their spread arrested—dramatic proof of the drenching power afforded by this remarkable master stream monitor.

Your town or plant can well benefit from the fire suppression advantages this powerful monitor offers. The Chiksan Intelli-Giant, equipped with a 3" nozzle, is capable of delivering up to 2500 gpm, a far reaching 425' in distance, and 165' in height, yet it actually costs less than ordinary monitors. Send for literature and prices today.

The above editorial appeared in the Main Line Times, Ardmore, Pa., shortly after the Autocar fire. Reprinted by permission.

CHIKSAN

A SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION

Please address: Dept. 177

Be sure you see **MODERN FIREFIGHTING**

An informative movie on the latest development in master stream equipment. Write Chiksan Company, 330 No. Pomona Avenue, Brea, Calif., to arrange a showing.

CHIKSAN COMPANY—BREA, CALIFORNIA • CHICAGO 5, ILLINOIS • NEWARK 2, NEW JERSEY

Well Equipment Mfg. Corp. (Division), Houston 1, Texas • Subsidiaries: Chiksan Export Company • Chiksan of Canada, Ltd.

When inquiring check 4788 opposite last page

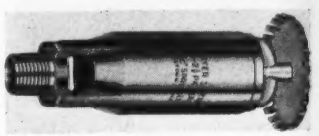
New designs for upright, pendent sprinkler heads

Provides air-foam and water-spray fire protection

Uses: For furnishing fire protection.

Features: Pendent sprinkler head, previously unavailable for this use, permits adaptation of water sprinkler systems to combination use in special hazard situations without re-piping, even where space is limited between present piping and ceiling.

Description: Sprinkler heads first discharge large volume of thick foam to blanket surface fires, then produce water spray. Water spray is more economical than continuous foam discharge and provides additional protection to surrounding surfaces from fires at broken chemical or fuel lines.



Upright and pendent sprinkler heads provide air-foam and water-spray fire protection

(Combination air-foam and water-spray sprinkler heads are product of "Automatic" Sprinkler Corporation of America, Dept. CP, Youngstown 1, Ohio . . . or for more information check 4789 on form opposite last page.)

Dust hood air-inflates to give unrestricted head movement

Inflatable dust hood is made of clear vinyl film

Uses: Eliminating need of headgear and respirator when working in surroundings containing dusts.

Features: Plastic hood is inflated to give wearer unrestricted head movement. Air supply does double duty of providing breathing-air and inflating hood.

Flow of fresh air aids in keeping hood's window clear of fog

Description: Made of vinyl film, dust hood has clear, flexible vinyl window hermetically sealed in. Flow of fresh air aids in keeping window clear of fog.

Relief valve operates in one direction, permitting air to exhaust and preventing contaminated air from entering. Drawstring makes seal around wearer's neck.

(StaSafe Airborne dust hood is manufactured by Standard Safety Equipment Co., Dept. CP, 232 W. Ontario St., Chicago 10, Ill. . . . or for more information check 4790 on form opposite last page.)

"Hey, Mac—Remember that guy you sent for a bucket of steam?"

One of a series.

Some Things to Think About Steam Traps

. . . in order to get high operating efficiency and a minimum of maintenance

The gentleman who invented the wheel had a basic idea and so far no one has come up with anything better for the purpose.

If you'll pardon us for a little overemphasis on the significance of steam traps, we'd like to liken one of them to the wheel.

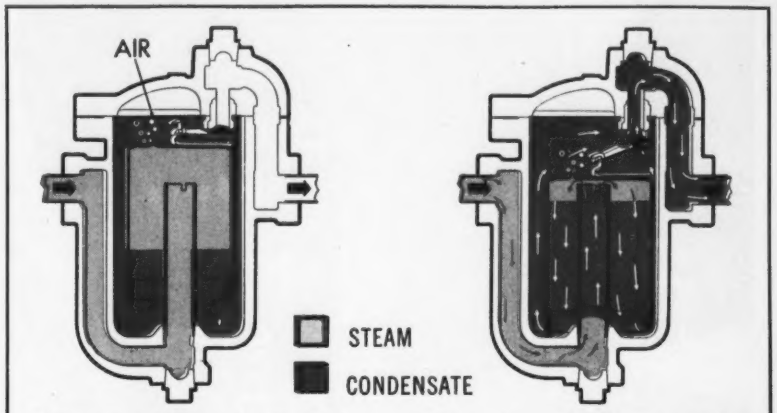
In 1911, when the first Armstrong inverted bucket steam trap model was announced to the world, or at least that part of the world that modest advertising and sales budgets would cover, it was not received with equal enthusiasm by all (especially old-style trap makers). But, like the wheel, it managed to find its way into general use. And, nothing better has ever turned up for the purpose of draining condensate. As a matter of fact, the Armstrong trap has been very widely copied. Today, there are more inverted bucket traps draining process equipment than any other kind. Of these, there are more Armstrongs.

If this sounds like the boasting of a proud parent, give consideration to some fundamental requirements not met by all traps:

1. ***A steam trap should not leak steam.*** Some traps do, you know, because of the nature of their operating principle. No steam ever gets to the Armstrong trap orifice. The valve is always water sealed.

2. ***A steam trap should vent "air" as fast as it accumulates***—otherwise temperatures are reduced and corrosion is a problem. The Armstrong trap handles air very nicely. The vent in the bucket permits air to accumulate in the top of the trap, from where it is discharged when the trap opens. For extreme conditions like draining paper machine dryers, some jacketed kettles and certain other units, the vent is sized larger for the job. And, for handling big volumes of air during warm-up, a bucket with an auxiliary thermic vent really speeds up heating.

3. ***A steam trap should discharge condensate at steam temperature*** if you want to get maximum efficiency from the unit drained. And most people certainly do. If you have to wait for the condensate to cool, it's almost impossible to maintain maximum temperatures and prevent air build-up. You guessed it—the Armstrong trap opens for water, without dependence on temperature.



Trap closed. Steam has floated inverted bucket; valve is held tightly closed by system pressure. Air entering trap passes through bucket vent and accumulates at top of trap.

Trap open. Condensate entering trap has caused bucket to lose buoyancy. Weight of bucket times leverage pulls valve open. Air is discharged along with condensate.

4. ***A steam trap should be suitable for any return system.*** The Armstrong trap works just the same whether discharging to atmosphere, back pressure or vacuum. It has been conclusively proved that flash steam resulting from use of a bucket trap does not cause a problem in vacuum return systems. The flash condenses rapidly. It's the leaky traps that cause the headaches.

5. ***A steam trap should not be a "prima donna".*** Some kinds of traps take an awful lot of care and coddling. The Armstrong trap is a rough and ready type with a hardened chrome steel constitution (valve and seat, to be exact). It cleans itself of ordinary dirt and scale without choking up. Its 18-8 stainless parts stave off rust and corrosion. It resists wire-drawing and wear remarkably well. In fact, it stays on the job longer with less attention than any trap ever produced. Unless you live in Siberia, you can probably find a user around the corner who will tell you so from experience.

6. ***A trap should not be an "orphan".*** With Armstrong traps you can *always* get prompt service and parts from nearby Factory Representatives and stocking distributors as well as from the factory.

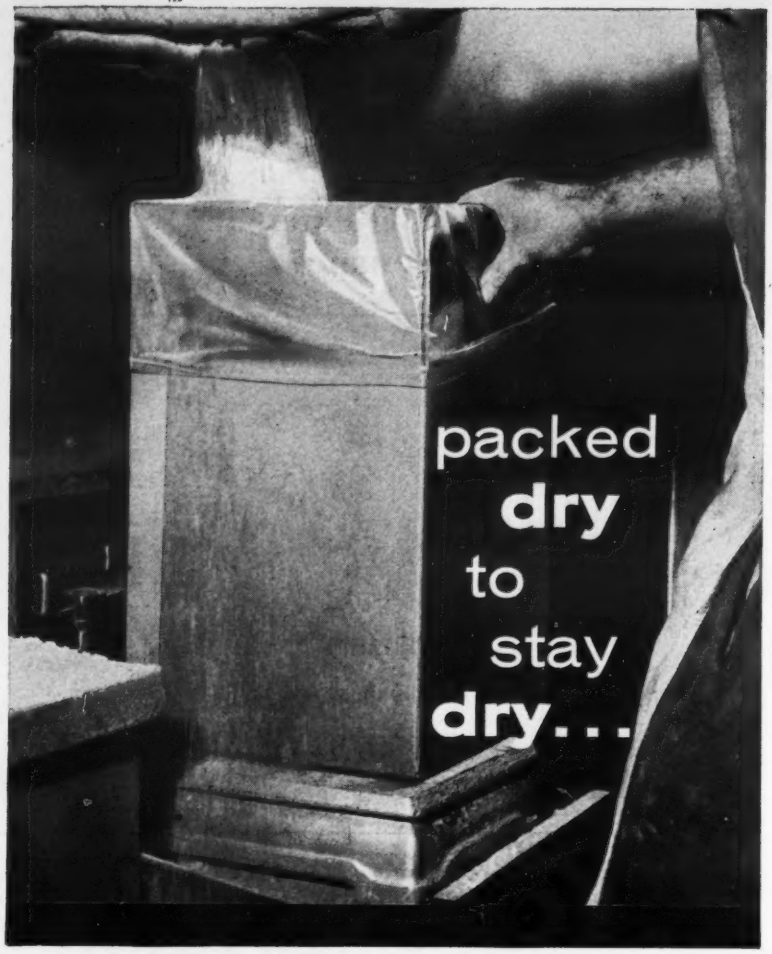
7. ***A trap should have a guarantee.*** The Armstrong trap is unconditionally guaranteed to give you *complete satisfaction* (as to doing its job, that is). If it doesn't, you can get your money back.

If you'd like to buy some of these excellent steam traps, call your local Armstrong Representative or write **Armstrong Machine Works, 8804 Maple St., Three Rivers, Michigan.**

ASK FOR the 44-page Steam Trap Book, free on request without obligation.

ARMSTRONG STEAM TRAPS

When inquiring check 4791 opposite last page



in VISQUEEN film

Trade Mark

Hygroscopics pick up no moisture in transit or storage when they are packed in drums or cartons with liners of VISQUEEN 'L' film. VISQUEEN 'L' film is film especially made for chemicals and all products easily damaged by moisture.

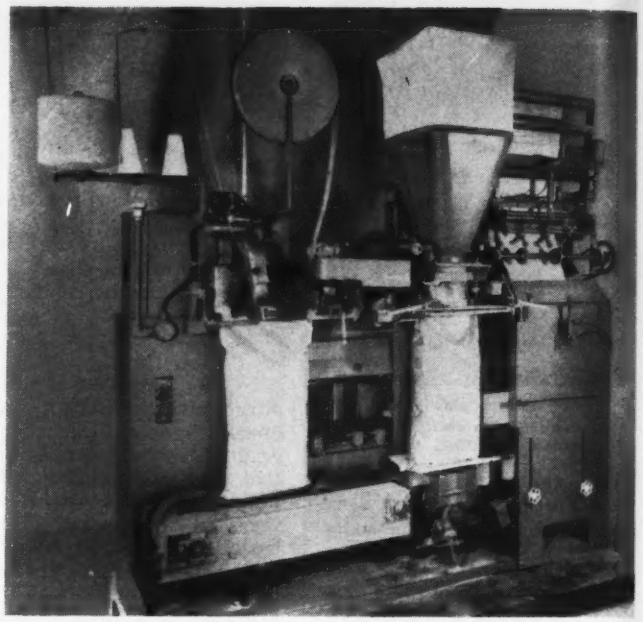
Strong—and as pinhole free as a polyethylene film can be. Economical too. Saves shipping weight. Gives greater product recovery. Remains pliable at temperatures as low as –72° Fahrenheit.

VisQueen Trade Mark film is all polyethylene, but not all polyethylene is VISQUEEN. VISQUEEN film has the benefit of research and resources of VISKING COMPANY.

PLASTICS DIVISION
VISKING COMPANY
Division of Union Carbide Corporation
P. O. BOX 1410 TERRE HAUTE, INDIANA
In Canada: VISKING LIMITED, Lindsay, Ontario

Information request tag
VisQueen Trade Mark
clip this tag—#CP7
attach to letterhead, mail.

When inquiring check 4792 opposite last page



Automatic packaging machine handles 6 to 12 bags per minute

Packing 25- to 125-lb bags with dry, free-flowing materials? Then you will want to take a look at this automatic machine that . . .

positions, opens, fills, closes, and sews open-mouth bags

Uses: Automatic packaging machine positions, opens, fills, closes, and sews, with or without tape, open-mouth multiwall bags holding 25 to 125 lb of granular, free-flowing materials. Can also handle semi-free-flowing materials with auxiliary equipment.

Features: Fills accurately at a speed which matches production of most scales used in conjunction with open-mouth packers. Closures are tight and accurate since system provides for proper control of gussets and bag-top at all times during filling and sewing.

Bag is moved under filling spout and through sewing machine automatically. Only one man is needed to keep machine supplied with empty bags, tape, and thread. This man probably can handle two or more adjacent machines at same time.

Production capacity is 6 to 12 bags per minute.

Description: Empty multiwall paper bags are placed in bag feeder. Bags are pulled out of feeder-rack one at a time by power roller which drives them down to opening, filling, and closing level, and registers them in bag-index-

ing position. Bag is then positioned accurately so its top will be properly located.

As bag is advanced, top-opening device parts leading gusset and holds ply open for entry of clam-shape filling spout. When spout is all the way into the bag, it opens, thus forcing bag-top open. V-belts are pulled tight around top of bag, sealing it. V-belt pulleys clamp bag at gusset. Material to be packed has been pre-weighed to correct weight, and is held in a scale bucket. As bag advances toward filling position, charge is released from scale bucket and reaches bag just after it has been opened. Bag settler at filling station lowers level of material in bag.

When bag is filled completely, filling spout moves out, allowing the V-belts to draw top of bag together in straight line. Bag top is then trimmed slightly (to insure a firm top and good sewing), tape is applied, and bag is sewed. Bag then goes to take-away conveyor or chute.

(VredOMatic packer is available from St. Regis Paper Co., Dept. CP, 150 E. 42nd St., New York 17, N.Y. Check 4793 opposite last page.)

Here's polyester tape for heat-sealing Mylar film

Uses: Designed for heat-sealing Mylar film, tape can be used for laminating polyester films, wood, paper, glass, fabrics, asbestos, metals, and leather in various combinations.

Features: Thermoplastic polyester tape offers convenient method of obtaining positive seal on Mylar film.

Description: Tape is available in three types: 1) as a polyester resin tape without Mylar backing, 2) with Mylar backing, coated on one side with resin adhesive, or 3) with Mylar sandwiched between two coatings of adhesive.

(GT Tape is product of G. T. Schjeldahl Co., Dept. CP, Northfield, Minn. Check 4794 opposite last page.)

Because Vulcan stocks the widest selection of Hi-Bake lined pails possible, manufacturers of chemicals, foods, drugs, oils, fertilizers, paints, varnishes and other hard-to-hold products have turned to Vulcan. They find Vulcan's years of experience coupled with constant field and laboratory research invaluable in solving their lining problems.

Do what so many others have done . . . bring your lining problems to Vulcan *first*. Let Vulcan's chemists lining-test your product. They will develop a Hi-Bake lining that will meet your most rigid specifications . . . one that will protect and maintain the quality and uniformity of your product. It will pay you in time and money saved.

Samples gladly supplied on request. Call or write today.

VULCAN

Over 40 years Container Experience

VULCAN CONTAINERS INC.

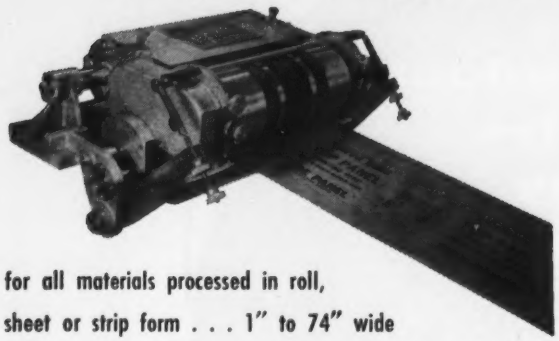
Bellwood, Illinois
(Chicago Suburb)
Phone Linden 4-5000

In Canada:
Vulcan Containers Ltd.
Toronto 15, Ontario

Representatives in all principal cities
See "Pails" in Classified Phone Directories

When inquiring check 4795 opposite last page

Prints your product as you make it!



for all materials processed in roll,

sheet or strip form . . . 1" to 74" wide

Here's the practical modern way to print trademarks, brand names, part numbers, code-dates, continuous or repeated designs on any material processed in a web . . . sheathing, wallboard, screening, linoleum, gasket material, paper, plastics, cloth, laminates, etc. Gottscho web-printers operate as part of your present production set-up, eliminate cost of printing as a separate operation. Clean, permanent impressions assured on anything from .001" to 1.0" thick . . . flexible or rigid . . . 1" to 74" wide. Uses fast-drying inks of any color for light or dark surfaces.

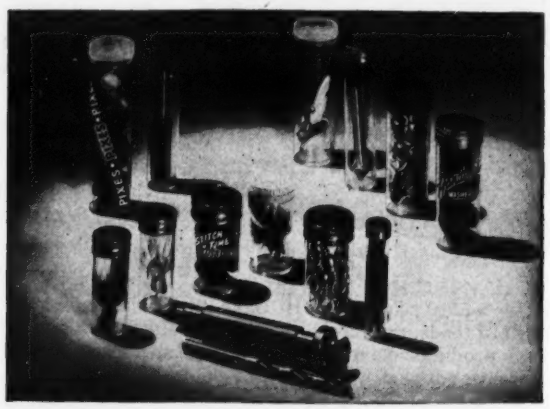
Write for details

Gottscho **ADOLPH GOTTSCHO, INC.** Dept. W, **Hillside 5, N. J.**

Automatic CODING, MARKING, IMPRINTING MACHINES

In Canada: **RICHARDSON AGENCIES, LTD., Toronto & Montreal**

When inquiring check 4796 opposite last page



LERMER PLASTIC CONTAINERS
Help You Make Satisfied Customers

- They are shatterproof, assuring long life.
- They are 75% lighter than glass, effecting enormous savings in shipping.
- They are available clear or opaque in a multitude of lustrous colors.
- They can be handsomely decorated and printed during manufacture to carry your story.

LERMER PLASTICS, INC. 530 South Ave. Garwood, N. J.

REPRESENTATIVES IN THESE CITIES: Rochester, Memphis, Miami, Cincinnati, Columbus, Cleveland, Chicago, Detroit, Minneapolis, San Francisco, Los Angeles, Toronto, Philadelphia.

PIONEERS AND SPECIALISTS IN PLASTIC CONTAINERS

When inquiring check 4797 opposite last page

Handling adhesives at high speeds? Here are tips

Handling of adhesives in high-speed production machinery requires some skill and experience. Here are a few tips on how to do it.

1. Using hand-filled pots:

Removable trays or pans (or foil linings) are often used to make loading and washing of pots easier. With modern resin-base adhesives, linings in fixed pots are being used.

Compounds are available which are used to coat glue pots before filling to permit easier removal of dried glue. Examples are silicones, Teflon, and neutral petroleum jellies.

2. From pot to applicator:

Generally, adhesive is fed from pot to applicator by simple dipping of a mechanical finger or the work itself, immersion of pickup rolls, or gravity flow through side or bottom openings. Closed systems with either pressure of gravity feed are coming into increasing use.

Mechanical pumps within machinery are becoming more common. They have advantage of drives which can be easily coordinated with varying machine speeds.

Pressure systems in which air causes adhesive to flow from closed vessel are particularly useful where adhesive stability is adversely affected by mechanical action. With great variety of pneumatic controls available, it is easy for machine designer or plant manager to adapt air systems to intermittent glue feeds. Transparent plastic vessels and tubing in these arrangements permit inspection of condition and flow of adhesive.

3. Metals of construction

With natural latex-base adhesives, do not use copper or copper-bearing alloys in applicator, pot, or lines. Slightest contamination with this metal (not necessarily noticeable at time of application) may result in progressive deterioration of the film.

4. Maintenance:

When it is found necessary to leave adhesive in machine overnight, it is advantageous to cover rolls and pot with

What's a "New Solution"?

It's an article in CHEMICAL PROCESSING describing a new way of solving a tough plant operating problem.

In each issue you will find specific "case histories" showing how these processing problems were solved.

Each article states the operating problem . . . explains the process used and gives details of how problem *was solved* . . . shows results secured.

Take a look at "New Solutions" articles in this issue— they might suggest a "solution" for some of your tough processing problems.

clean wet cloths to prevent skinning, crusting, or bodying-up.

5. Dilution of adhesives:

Dilution should be performed in an outside container rather than in glue pot where proper mixing is difficult. When dilution is required of glue already in pot, use a thinned adhesive mixture rather than raw solvent or water.

(Above hints can be found in 12-page Technical Service Bul issued by Paisley Products, Inc., Div. of Morningstar, Nicol, Inc., Dept. CP, 630 W. 51st St., New York 19, N. Y. . . . or for more information check 4798 on form opposite last page.)

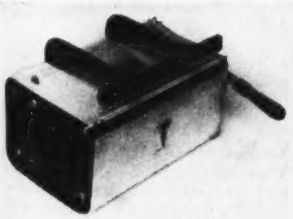
Closely controls heat sealing plastic film

Timers control heating, cooling cycles

Uses: Sealing packages made of polyethylene (up to 15-gage, and low-pressure polyethylene), Mylar, Pliofilm, vinyl, Saran, and nylon film.

Features: Heating and cooling times are controlled by electric timers. Correct sealing cycle can be set up for particular plastic film.

Description: Units are either hand- or foot-pedal operated. Compact and lightweight, they



Electric timers control heating, cooling for proper sealing

plug into standard electric outlet for operation.

(Pacemaker thermal impulse heat sealer is manufactured by Packaging Industries, Dept. CP, Montclair, N.J. Check 4799 opposite last page.)

Peppermint and spearmint oils must be kept pure to insure uniform flavor. That's the chief reason why I. P. Callison & Sons, Inc. of Seattle changed from coated steel drums to Benson Aluminum Drums for shipping these expensive oils. They believe, "It will only be a matter of time before the industry adopts aluminum as a standard for drum packaging".

Because aluminum resists corrosion there is no metal coating inside aluminum drums . . . nothing to flake off and contaminate the oils.

And aluminum drums offer economy. Aluminum's strength helps them withstand greater shock in handling and shipping. Aluminum's light weight provides substantial freight savings. And aluminum drums are easier to clean for re-use.

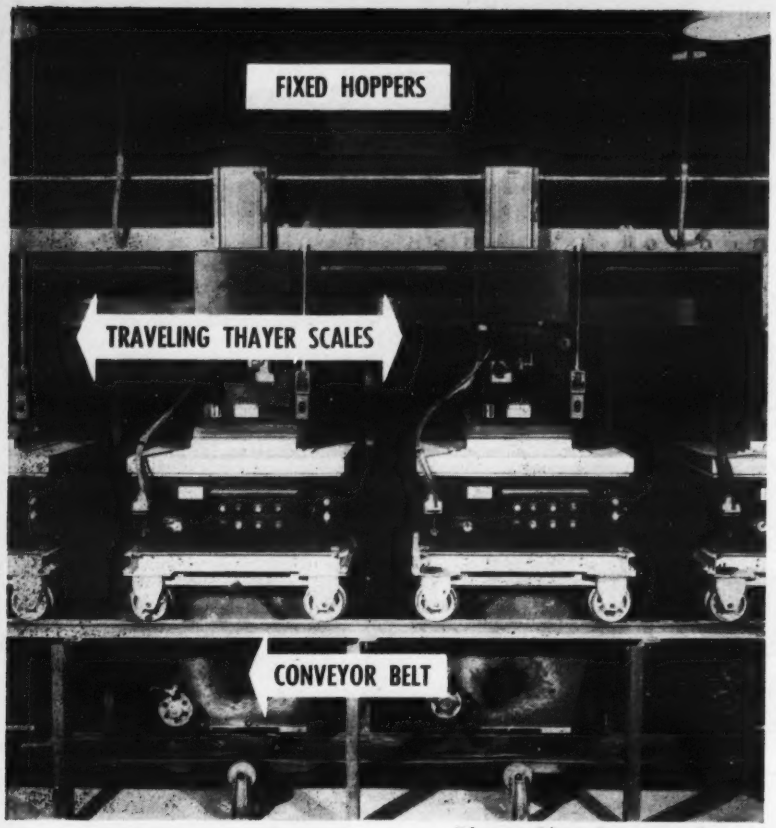
For further information about proven benefits of Benson Aluminum Drums, contact the Reynolds office listed under "Aluminum" in classified telephone directories or write *Reynolds Metals Company, P. O. Box 1800-CO, Louisville 1, Kentucky.*

See "CIRCUS BOY", Reynolds exciting dramatic series, Sundays on NBC-TV.

The Finest Products Made with Aluminum are made with REYNOLDS ALUMINUM

REYNOLDS ALUMINUM

When inquiring check 4800 opposite last page



Thayer Plate Leverage System guaranteed accurate for the life of the scale.

Traveling Thayer Scales **cut batching costs—** increase accuracy to 1/4%

A low cost, variable formula batching system can be installed by putting a series of automatic Thayer Scales on tracks under a line of hoppers holding the various ingredients. The individual scales are rolled under the hoppers to be used and set to the weights in the formula. The Thayer Scales will then automatically discharge the ingredients on a common conveyor belt to form batches of unvarying accuracy. Neither dust, shock, nor different flow characteristics will affect continued accuracy as the Thayer Plate Leverage System is *guaranteed accurate for the life of the scale* and requires no maintenance under normal usage. Investigate the various Thayer Batching and Continuous Weighing Systems.

THE Thayer SCALE

BATCHING • FILLING • CHECKING — AUTOMATICALLY BY WEIGHT

AUTOWEIGHTION

THE THAYER SCALE CORP., 4 Thayer Park, Pembroke, Mass.

When inquiring check 4801 opposite last page

as seamless as her best hose...

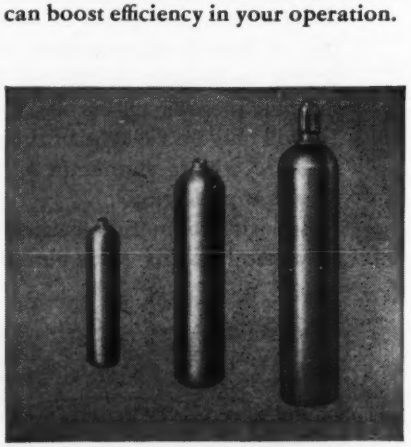
Super smooth and lightweight, Hackney cylinders cut handling costs

Hackney's special Deep Drawing process eliminates unnecessary cylinder weight and smooths cylinder surfaces.

That's why these versatile cylinders are used to ship and store many compressed gases at greater savings. Designed for compact neatness and built strong, Hackney cylinders are precision-controlled to meet your specifications.

See how many Hackney cylinders are used in today's industries—for medicinal gases, for flame cutting systems, for power actuators in the automotive and aviation fields, for mining inhalators, for fire extinguishers—in fact, wherever safety, dependability and economy are needed in a cylinder.

Write for specification sheets and see how Hackney seamless cylinders can boost efficiency in your operation.



Besides seamless cylinders, Hackney also produces a complete line of larger two-piece cylinders—all easy to handle, with low tare weight to save shipping dollars.

Pressed Steel Tank Company

Manufacturer of Hackney Products

1463 South 66th Street, Milwaukee 14, Wisconsin

Branch offices in principal cities

Hackney

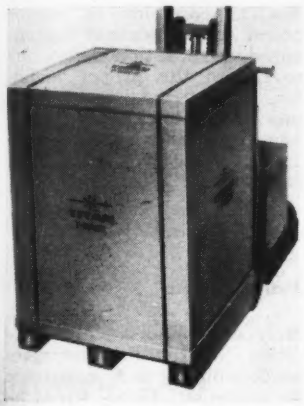
CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLI

When inquiring check 4803 opposite last page

One-ton container with built-in pallet is expendable

Uses: Handling and shipping granulars, salts, powders, and chemicals.

Features: Expendable bulk material container has pallet-design bottom. It is delivered knocked-down for setting-up as needed.



Expendable, self-palletized container holds up to one ton

Description: Internally supported unit has lid which can be strapped or taped. It is designed to accommodate up to one ton, depending on material density, and is proportioned for compact storage in standard boxcars and trailer trucks.

Standard specifications are 35x35x48", which can be varied on particular requirements.

(T Pack expendable containers are manufactured by Titan Pallet Co., Dept. CP, 527 Madison Ave., New York 22, N.Y. Check 4804 opposite last page.)

Forms cartons

Pneumatically driven machine that automatically opens, forms, and seals cases is pictured and described in one-page bulletin. Operation, construction, and specifications are covered. Case opening and forming machine bul — Schroeder Machines Corporation, Dept. CP, East Syracuse, N.Y. Check 4805.

The finest containers available for variety, versatility and value

No matter what product you pack, Continental Fibre Drums offer you the widest choice of size, style, and design, combined with rugged durability. From protecting chemicals to preserving the fragrance and freshness of spices, you are sure your product is safe. It has the protection of a superior container.

And Continental offers real value because you get top quality at low cost. The light weight of these fibre drums cuts down on high freight costs, too.

You get service because our fibre drums are tailor made to suit your product. So get all the advantages of Continental Fibre Drums . . . Leverpak, Stapak, or Fiberpak. You have the finest when you pack your product in a Fibre Drum by Continental.

CONTINENTAL CAN COMPANY

FIBRE DRUM & CORRUGATED BOX DIVISION, NEW YORK, N. Y.

Van Wert • Philadelphia • Pittsburgh • Tonawanda • Cleveland • Chicago • Atlanta • St. Louis • San Francisco • Los Angeles • Eau Claire • Boston

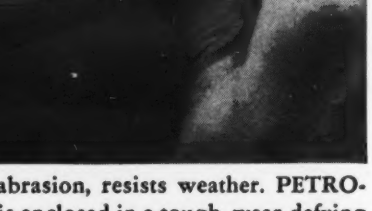
When inquiring check 4806 opposite last page

Pictures tell why PETROCHEM does MORE than fight fire

IT'S RUGGED . . . stands up to abrasion, resists weather. PETROCHEM'S oil-resistant Neoprene tube is enclosed in a tough, wear-defying Dacron* jacket. It's a rugged, light, flexible fire hose that wears and wears.

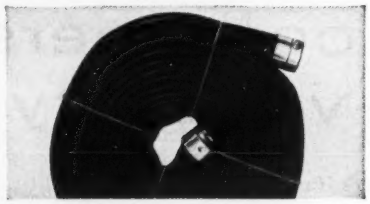
*Reg. T.M. E.I. Dupont de Nemours & Co.

IT'S STRONG . . . strong enough to withstand 500 lbs. pressure and 300°F. temperature.



IT'S OIL AND CHEMICAL RESISTANT . . . fights off deterioration both inside and out.

IT'S FLEXIBLE . . . so flexible it takes tight twists without injury.



IT'S EASILY COILED . . . requires a minimum of storage space.

These are the reasons why it will pay you to consider PETROCHEM fire hose in your safety planning. Your Quaker-Quaker Pioneer distributor provides extra-fast service. See him today. For more information, please write to: *H. K. Porter Company, Inc., Quaker Rubber Division, Philadelphia 24, Pa., or Pittsburg, Calif.*

HKP QUAKER RUBBER DIVISION
H. K. PORTER COMPANY, INC.

When inquiring check 4807 opposite last page

CP BRIEFS from contemporary publications

Abstracts of pertinent articles in other industrial publications . . . selected by CP editors as a service to you

Rust inhibitors

Test methods for rust inhibitors are covered in relation to three classes of service that correspond to flowing, static, and condensation conditions. A new procedure based on the Indiana conductometric test is satisfactory for low rates of corrosion. Six pages, 11 figures, seven references. (*"Corrosion," February* 1957, *page* 19.)

Synthetic rubbers

This paper deals with well-known types of synthetic rubber, how they are made, their differences, and where they perform best. Included are styrene-butadiene, synthetic natural, nitriles, butyls, silicones, polysulfides, polyurethanes, carboxylics, polyacrylate elastomers, chlorosulfonated polyethylene, and fluoroethylene elastomers. Six pages, one table. (*"Petroleum Refiner," March* 1957, *page* 148.)

Glass-fabric laminates

Properties of silicone and melamine glass-fabric laminates at 400-600°F are reported. Static tension, static compression and tension creep tests are featured. Eleven pages, three tables, 23 figures, 10 references. (*"Modern Plastics," March* 1957, *page* 185.)

Tolerance limits

Two ways to determine the size of samples in connection with the Wilks tolerance limits are considered. Both show practical merit in statistical analyses. Three pages, 11 references. (*"Industrial Quality Control," April* 1957, *page* 11.)

Nuclear corrosion

Nuclear corrosion in reactor power plants cannot be ignored. This article helps one to choose the proper metals for pressurized-water reactors. Five pages, two figures, two references, one photograph. (*"Power," April* 1957, *page* 80.)

Molybdenum

Molybdenum as an alloy addition for titanium improves hardenability and resistance to oxidation. Good strength-weight properties at high temperatures can be achieved for alloys with 7% aluminum and 3% molybdenum. Six pages, one table, four figures. (*"Metal Progress," February* 1957, *page* 86.)

Peroxide bleaching

Alkaline peroxide bleaching of eastern spruce groundwood was studied. Reaction is first-order and some oxygen is formed. Rate and amounts of improvement in brightness increase as pH increases. Reflectance is increased as long as peroxide is present. Companion papers: 20 pages, four tables, 18 figures, 18 references. (*"Tappi," February* 1957, *page* 65.)

Epoxy coatings

Epoxy coatings for metal products give good adhesion, flexibility, toughness, and resistance to chemicals. Properties and uses of six main types of formulations are presented. Five pages, three tables, five photographs. (*"Materials and Methods," April* 1957, *page* 130.)

Ghostwriting of technical material

Following aspects of technical ghostwriting are covered: Ethics, meaning of authorship, indications of co-authorship, value, and importance of presentation. Two pages. (*"Mechanical Engineering," April* 1957, *page* 348.)

Combating corrosion

This discussion of combating corrosion in the petroleum industry is concerned with heat exchangers and condensers. Corrosion by salt water, hydrogen sulfide, organic acids, and electrolytic action is covered. Two pages. (*"Refining Engineer," April* 1957, *page* 791.)

Filtration

A British chemical engineer discusses the following aspects of filtration: atmospheric pollution, filter media, theoretical and practical studies, filters in unit processes, and filtration by means of sound waves. Four pages, two photographs. (*"Chemical and Process Engineering," February* 1957, *page* 59.)

Chromatography

Whatman seed test paper with a thickness of 1.5 mm is used to isolate pure compounds by means of a simple chromatographic method. Three pages, one figure, nine references. (*"Analytical Chemistry," April* 1957, *page* 550.)

Uranium from wastes

Facilities for recovering uranium from aqueous wastes, processing it to an oxide, and fluorinating the oxide to uranium hexafluoride at a gaseous diffusion plant are discussed. Five pages, 14 figures, two tables. (*"Chemical Engineering Progress," February* 1957, *page* 65-F.)

Chlorinated polybutadiene

Compared to chlorinated natural rubber, chlorinated polybutadiene rubber exhibits greater resistance to alkalis and acids and higher tensile strength. Rubber-like products result from partial chlorination of butadiene-styrene copolymer. Six pages, 10 tables, two figures, 16 references. (*"Industrial and Engineering Chemistry," April* 1957, *page* 712.)

Gypsum plant

Modernization of a gypsum plant which makes insulating wallboard, wood-grain wallboard, and various grades of plaster is described. Plant represents an outlay of about a million dollars and a daily output of about 750 tons of rock. Six pages. (*"Rock Products," February* 1957, *page* 98.)

Fluidization

From England come statements of principles pertaining to fluidization as applied to handling of bulk solids. Examples of current practice are presented. Six pages, 16 figures. (*"Industrial Chemist," April* 1957, *page* 181.)

Lining kraft digesters

Protective liners are used to reduce corrosion of parent shells of kraft digesters. Several liners are described in detail. Six pages, one figure, 10 photographs. (*"Pulp and Paper Magazine of Canada," March* 1957, *page* 158.)

Films on aluminum

Test method for detecting presence or absence of chemical films on aluminum and aluminum alloys is described. Stannic chloride is employed. Two pages, two tables, three references. (*"Metal Finishing," April* 1957, *page* 65.)

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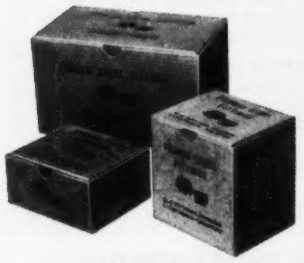
W-S FORGED STEEL FITTINGS



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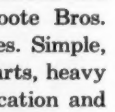

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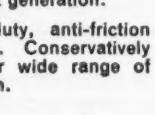

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Better Power Transmission Through Better Gears

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A typical installation of floating roof system at a refinery. Seal reduces evaporation loss of product, needs no maintenance

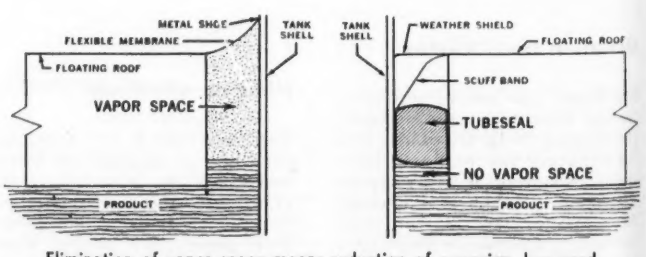
At Atlantic Refining Co., continuous movement of floating roof on storage tanks in tough run-down service meant greater wear of metal-shoe seals, product loss. Experimental installation proved Tubeseal system, which employs synthetic rubber and nylon, as . . .

floating-roof seal cuts product loss

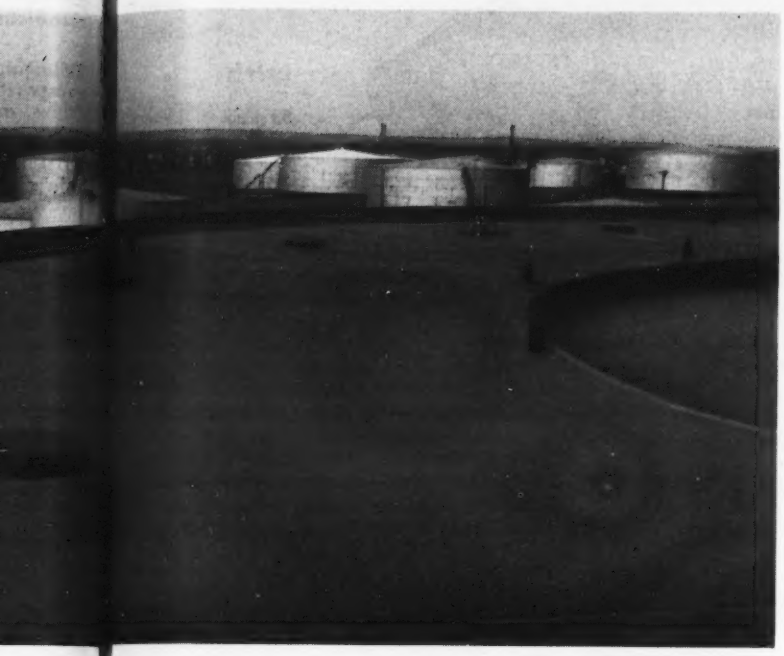
THEODORE W. WETT, Assistant Editor
With DR. H. V. HUME, Refinery Superintendent
Atlantic Refining Co., Philadelphia, Pa.

Problem: Metal-shoe seals on floating roof of naphtha storage tanks were not satisfactory for Atlantic Refining Co. Shoes wore, and seal was not tight. Moist air was either drawn into tank, one of the principal causes of tank corrosion, or product was lost by evaporation.

Tanks are used to store stabilized raw naphtha distillate, 320° to 330°F end point. Distillate contains from 0.01 to 0.08% sulfur as sulfur-containing compounds. Tanks have a diameter of 49′5″ and are 21′ high. Capacity is 6500 barrels. They are filled and drained every other day, so roof movement is almost constant.



Elimination of vapor space means reduction of corrosion, less product loss by evaporation



loss, needs no maintenance

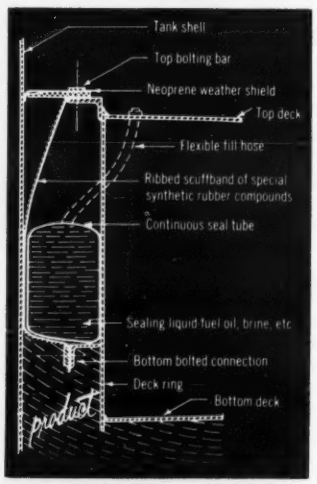
Solution: In March of 1955 Atlantic installed as an experimental unit, a Tubeseal floating roof system. System consists of an abrasion-resistant scuff band of synthetic rubber and a tube of similar material filled with liquid. They form a seal around edge of floating roof which completely eliminates all vapor space in seal area.

Ribbed scuff band is butadiene acrylonitrile synthetic rubber coating over a nylon backing having a total thickness of 3/16". Tube has a base fabric of nylon with rubber coating on each side, a total thickness of 0.04".

Ten-inch diameter tube filled with 450 gallons of kerosene, provides a definite contained volume of liquid which distributes a compensating pressure of seal over all irregularities. Approximately an eight-inch width of seal surface is in complete contact with tank shell.

Ribbed design of scuff band wipes tank shell dry as roof deck moves. It will not abrade, gouge, or wear tank wall. In test conducted to determine wear life of scuff band a total

Turn to next page

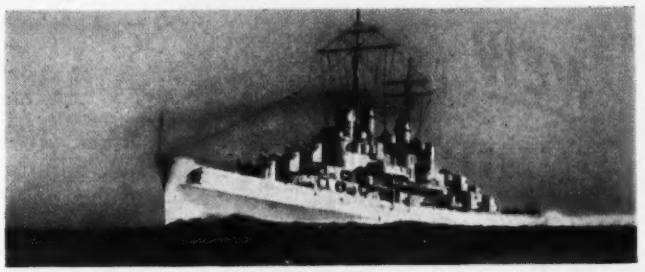


Construction of seal. Scuff band and tube are fabricated from butadiene acrylonitrile synthetic rubber and nylon

CORROSION
NO PROBLEM IN NEW NAVY
WASHDOWN SYSTEM

OVER 75
MILES OF
PROTECTION
with Boltaron
Unplasticized PVC

Washdown systems have been developed by the Navy to protect ships from the contamination of radioactive fallout during and after nuclear bomb blasts. The system provides a protective, cleansing spray of salt water that drenches all weather surfaces, washing radioactive particles overboard. Ships and men can continue in action. Boltaron Unplasticized PVC met not only the Navy's rigid specifications and exacting performance requirements, but also price competition and was chosen over all other materials for these important washdown systems. This Navy contract is the *largest single order of rigid PVC ever placed in this country*.



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- It is non-conductive, eliminates electrolysis problems.
- It is abrasion-resistant, gives long service.
- It needs virtually no maintenance.
- It is versatile, easy to handle.
- It is lightweight . . . ½ the weight of aluminum.

TECHNICAL SERVICE:
— *skilled engineers are on call to give you expert advice or service without obligation. Feel free to call on them at any time.*

TRAINING SCHOOL: The Plastic Fabricating Institute, Lawrence, Massachusetts sponsored by H. N. Hartwell and Bolta Products, was organized to instruct fabricators, distributors, piping contractors, etc., in the fabrication and application of Boltaron unplasticized PVC.

Contact your local distributor or write:

H. N. HARTWELL & SON, INC.
Industrial Plastics Division, Park Square Bldg., Box 507, Boston 16, Massachusetts
The only integrated source for Unplasticized PVC Materials

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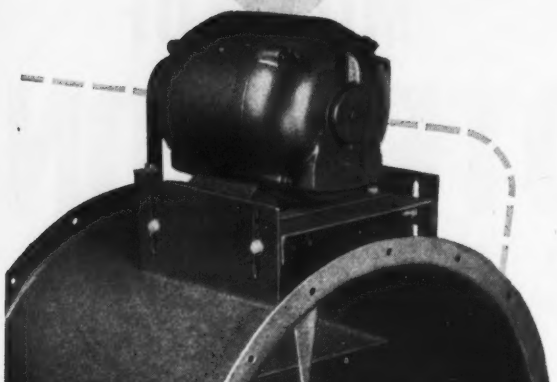
expel
FUMES, HEAT AND DUST
at LOW COST



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PROPELLAIR®
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Type "BT" Propellair Fans can be purchased and operated at low cost to handle difficult atmospheres such as highly corrosive, explosive, inflammable, grease or dust-laden air. Straight-line design permits easy, inexpensive installation. Platforms and duct elbows are eliminated. The externally mounted Robbins & Myers motor, sealed cast iron housed bearing assembly, air-tight drum and belt-tube provide complete protection. Standard models can handle temperatures up to 450° F. Propellair "BT" tubeaxial fans are available in sizes 16" to 60" for from 2000 to 85000 CFM air delivery.

WRITE FOR BULLETIN NO. 620-C

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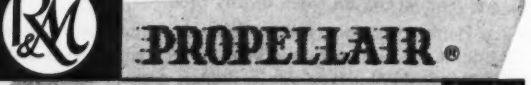


MOVING AIR IS OUR BUSINESS

When inquiring check 4811 opposite last page

Roof Seal

Starts on page 206

travel of 70,000 feet over rough welds and rivets left more than 2/3 of stock intact.

Results: Preliminary tests have indicated that product loss due to evaporation has been substantially reduced.

Seal has not required any maintenance since initial installation. No periodic inspection is necessary to insure that proper seal is maintained and, since system will not corrode, there is no problem of replacement or repair.

There has been no observable wear of the scuff band in spite of almost constant roof motion. Company has been well satisfied with seal's performance and plans to install system on other tanks used in similar service.

(Tubeseal system and floating roof tank were supplied by Hammond Iron Works, Dept. CP, 630 5th Ave., New York 20, New York . . . or check 4812 opposite last page.)

Belt drive eliminated, air compressor uses less floor space

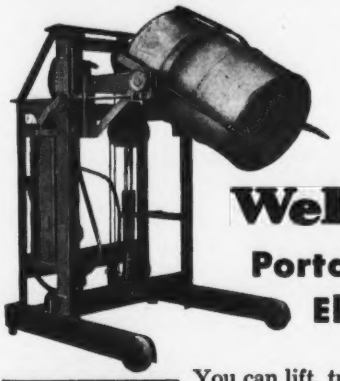
Uses: Compressing air.

Features: Hazardous belt drive is eliminated; compressor is flange-mounted directly on driving motor. Unit requires less than half floor space required for conventional units of equal size.

Description: Air compressor is two-stage, 200 psig rated motor-compressor available in 1½- and 2-hp sizes. Complete unit includes motor-compressor, cushioned rubber mounting on an ASME vertical tank, interconnecting pipe and fittings, and automatic start-and-stop control. Unit can be mounted on shelf, sidewall, or overhead bracket with air receiver located in an out-of-the-way place.

(Channel-Flo compressor is product of Ingersoll-Rand, Dept. CP, 11 Broadway, New York 4, N.Y. . . . or check 4813 on form opposite last page.)

Simplify, Speed Up
DRUM HANDLING



with
New
Weld-Bilt
Portable Drum
Elevator

"Weld-Bilt" PRODUCTS

You can lift, transport, store and DUMP all sizes of drums faster, easier, with this new WELD-BILT Portable Drum Elevator. Unique worm-gear tilting mechanism makes "last-drop" dumping safer, more efficient, with minimum effort. Lift, electric-hydraulic operated, is also available for hand operation or fully electrified. Jack-up type steering permits easy, safe positioning.

Write for prices on this important time and labor-saver.

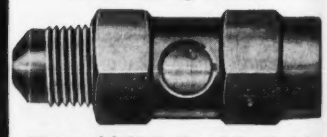
WEST BEND EQUIPMENT CORP.
MATERIALS HANDLING ENGINEERS
322 Water Street, West Bend, Wisconsin

When inquiring check 4814 opposite last page

MASS PRODUCTION
COSTS TOO HIGH?

Here's the ideal low-cost indicator for those hard-to-get-at places.

NEW "237"
LIQUID EYE
Positive Sealing Indicator



(Illustrated 3/8" M. FL. x 3/8" FE. FL.)

The new Allin "237" has all the proved Liquid Eye features plus:

- **smaller — more compact — dependable. (about 1/3'd smaller in the 3/8" male to female size than any previous unit).**
- **complete self-contained economy unit.**
- **new simplified design.**
- **available with 2 or 3 viewing ports.**

Custom units can be made to your exact specifications. Consult Allin engineers now.
Write today for full information and catalog covering complete Allin line.

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Over 1,000,000 Liquid Eyes Sold to Date!

When inquiring check 4815 opposite last page

Quiet vacuum pumps hold peak capacity throughout range

Provide 5 to 2200 microns, use no oil

Uses: Providing high vacuum for freeze-drying, vacuum melting, and heat treating, impregnation, and dehydration operations.

Features: Unit operates at peak capacity throughout pressure range of 5 to 2200 microns. No oil is used as pumping medium or sealant in high vacuum system.

Description: Mechanical-booster vacuum pumps are multi-stage units. High-vacuum or low-pressure stage is a high-capacity, positive-displacement blower. Two impellers turn at high speed in opposite directions to compress gas smoothly and move it to the high stage. Gas is then compressed further and discharged to atmosphere. Helical timing gears maintain proper relationship between impellers and provide quiet, low-maintenance operation. Low- and high-stage units are mounted on separate bases to allow for installation of inter-stage condensers, filters, traps, or valves.

(Series 4700 mechanical booster vacuum pumps are manufactured by NRC Equipment Corp., Dept. CP, 160 Charlemont St., Newton Highlands 61, Mass. . . . or for more information check 4816 opposite last page.)

Plastic closure file folder

Tabbed and punched for handy reference in file cabinet or binder, folder summarizes important data on line of threaded and non-threaded polyethylene caps and plugs for safeguarding products in process, storage, and transit. Dimension and price sheets for over 300 stocked sizes of 10 standard designs are contained in folder. File folder on "CaPlugs" — CaPlugs Div., Protective Closures Co., Inc., Dept. CP, 2207 Elmwood Ave., Buffalo 23, New York. Check 4817.

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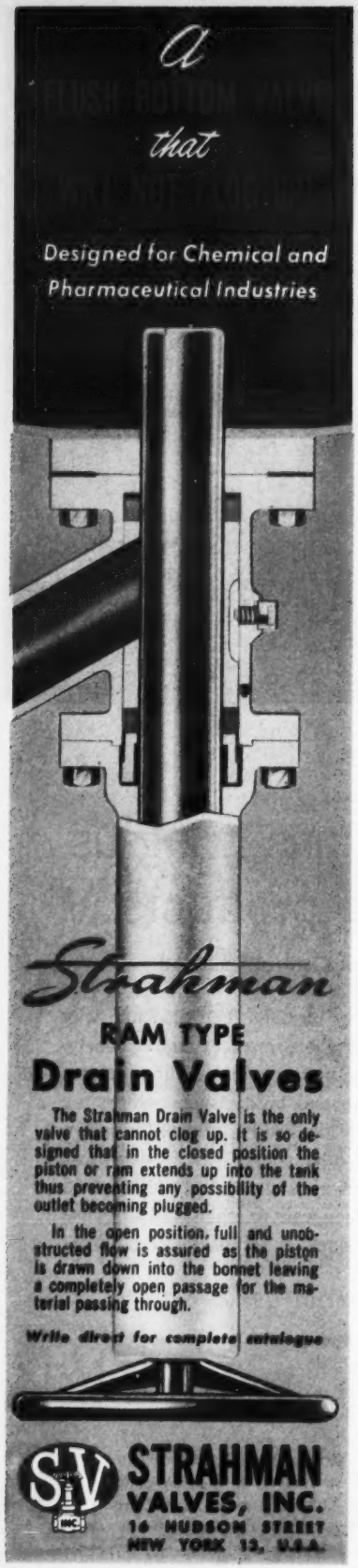
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Designed for Chemical and Pharmaceutical Industries
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RAM TYPE
Drain Valves
The Strahman Drain Valve is the only valve that cannot clog up. It is so designed that in the closed position the piston or ram extends up into the tank thus preventing any possibility of the outlet becoming plugged.
In the open position, full and unobstructed flow is assured as the piston is drawn down into the bonnet leaving a completely open passage for the material passing through.
Write direct for complete catalogue
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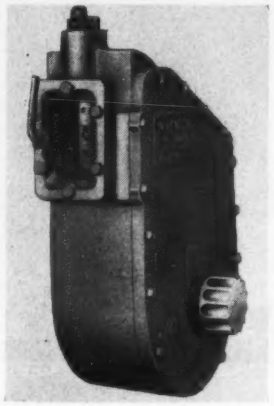
NEW YORK 13, U.S.A.

When inquiring check 4819 opposite last page

Storage-tank fittings for accurate levels, less evaporation

Uses: Products designed especially for storage tanks.

Features: Maximum accuracy is provided by tank gage. Vapor-tight hatch means minimum loss of product through evaporation.



Tank gage has high-visibility tape

Description: Hatch fittings provide automatic closing. They have resilient seal in cover which cushions impact of closing and assures positive tightness. Tank gage has high-visibility tape and tubular float.

(Storage tank fittings are product of Wheaton Brass Works, Dept. CP, Union, N.J. . . . or for more information check 4820 on form opposite last page.)

Motor starter gives greater protection against overload

Rugged air-break contactors reduce shorts

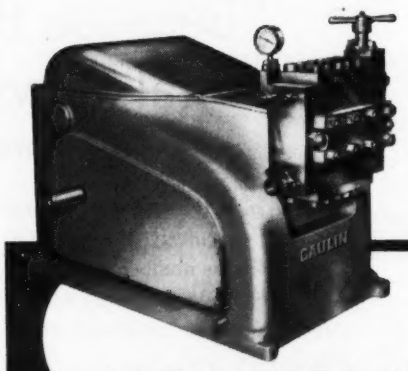
Uses: As high-voltage combination starters for squirrel-cage, wound rotor, and synchronous motors.

Features: Device provides increased overload and short-circuit protection

Description: Combination starter design includes completely steel-enclosed fuse

alphabetical index on page 244

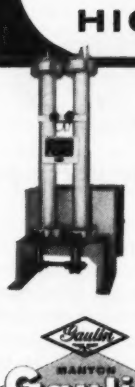
. . . for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 244. "Quick-locator" starting on that page was a feature in CHEMICAL PROCESSING years ago. It means extra work for the Editors, but it helps you, the reader in finding what you want . . . in a hurry!



Pump, Control, Move *Liquids, Slurries, Viscous and Abrasive Fluids*

with

GAULIN HIGH PRESSURE PUMPS



These two special pumps can control and move a wide variety of materials.

Triplex Hi-Pressure Pumps handle large volume of all types and densities of fluids. Capacities to 6000 gph, pressures to 8000 psi, temperatures from −90°F to +550°F. Used for all types of product—sanitary, corrosive, abrasive, viscous and volatile — for transfer, metering, injection, testing and spray drying.

Gaulin HX — hydraulic pressure exchange pump — specially designed for extremely abrasive and corrosive muds, slurries and solutions. Slow cycle operation — no plungers, no packing pressures to 2000 psi, capacities to 120 gpm.

Ask for G.T.A. to help you select the right pump for your requirement...over 100 different models have been developed to handle all types of pumping problems.

MANTON Gaulin

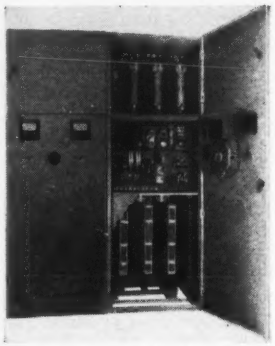
G. T. A. . . . Means Gaulin Technical Assistance — best source on how to mix or move your product.

FREE! *Send for the G.T.A. Library of Product Information.*

Manton-Gaulin Manufacturing Co., Inc., 55 Garden Street, Everett 49, Mass.

When inquiring check 4821 opposite last page

compartment. Individual fuses are isolated by full depth phase barriers. Unit contains removable contact barrier with assembly access from front or rear, and insured compartment separation through flanged door housings. Starters are suitable for control and protection of all types of three-phase, 50-60 cycle AC motors operated at 2300-4800 volts. Interrupting ratings of starters are: 150,000 kva at 2300 volts, and 250,000 kva at 4160-4600 volts.



High-voltage combination starter features greater load safety and easier assembly accessibility

starters are product of Federal Pacific Electric Co., Dept. CP, 888 N. Keyser Ave., Scranton, Pa. Check 4822 opposite last page.)

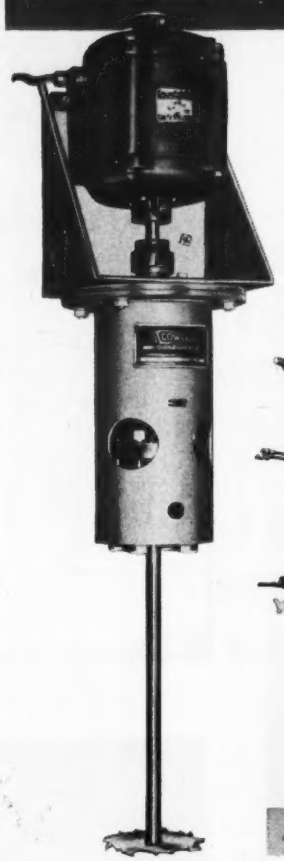
FOR MORE INFORMATION

Here's what to do when you want additional details about products and services in this issue's editorial articles or advertisements.

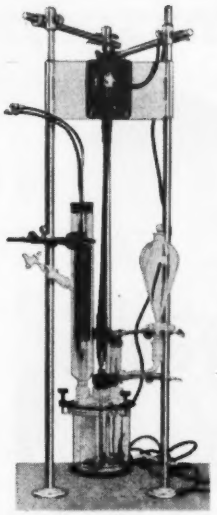
Note the number at end of article or advertisement. Check this key number on Reader Service slip opposite last page of this issue. Fill in Slip with the other pertinent information (name, title, company, address, product). Mail to our Reader Service Department.

We'll contact the manufacturer for you. He'll send the details direct.

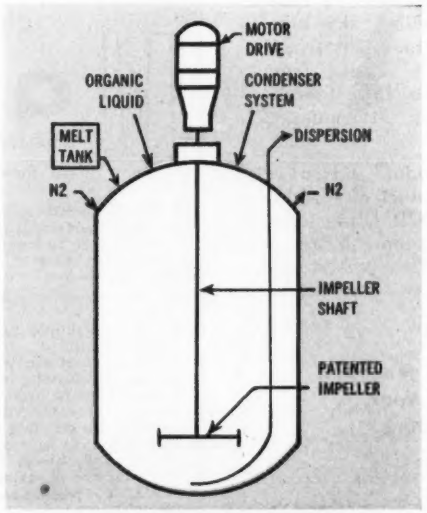
New Cowles Dissolvers Can Help You Solve Metallic Dispersion and Reaction Problems



Cowles Pilot-Plant Sodium Dispersion Dissolver



Cowles Laboratory Sodium Dispersion Dissolver



Schematic Plant Diagram

Big volume sodium and lithium dispersions finished in 30 minutes or less, particle size as small as 2 microns, with plant-proven Cowles equipment.

Highest quality metallic dispersions can now be easily controlled and produced in big volume, making many reactions commercially practical for the first time.

Key to the new method is the unique action of the patented Cowles impeller. With rim speeds of up to 6150 fpm, the impeller vanes create a zone of intense turbulence and hydraulic shear. The liquid is moved rapidly through itself until maximum dispersion is obtained. The Cowles thus gives several many very important advantages:

Versatility — prepares material for many reactions under conditions not heretofore possible.

Finer particle size — gives maximum reaction surface to dispersed elements.

More complete dispersion — assures complete homogeneity of material.

Greater speed — cuts finished dispersion time substantially.

Cleanliness — self-cleaning impeller will not clog with metal.

Safety — gives the close control necessary with highly active materials.

Predictable results — laboratory and pilot-plant models provide results easily duplicated in larger models.

New Cowles Dissolvers with properly sealed and specially designed drives for metallic dispersions are available for all purposes. Included are "package" models in both laboratory and pilot plant types, and models for commercial production. All are thoroughly proven in actual plant operations and represent the broad experience and know-how of our organization – the established leader in its field. Specialized engineering assistance can be supplied if desired.

For complete information write today for Technical Bulletin No. 21-1957, "Metallic Dispersions with the Cowles Dissolver."

Additional Cowles Dissolver models are available for efficient processing of all solid-liquid, liquid-liquid and gas-liquid products.

Take advantage of the unusual *Morehouse-Cowles Processing Equipment Application Service* at no obligation – for a comprehensive survey of your plant requirements and end products, with laboratory assistance and in-plant tests at our risk.

MOREHOUSE® COWLES®

MOREHOUSE-COWLES, INC.
1150 San Fernando Road, Los Angeles 65, California
Distributors in Principal Cities
Convenient lease and time-payment plans

5702

When inquiring check 4823 opposite last page

ARROW
AUTOPNEUMATIC CONTROL

The QUALITY ASSEMBLY
to thoroughly condition and control compressed air for pneumatic power tools and appliances.
• Filters • Regulates • Lubricates
Assemblies and units supplied in sizes ¼"-⅜"-½"-¾"-1" and 2" NPT.

The ARROW FILTER
- Removes up to 98% Free Moisture
- .001" to .002" Particle Removal
- Sintered Bronze Filter Element

The ARROW REGULATOR
- Self Bleed Assures Accurate Control
- Instantaneous Response
- In Line Flow

The ARROW LUBRICATOR
- Mist Lubrication
- Mist Proportional to Air Flow
- Lubricates Only When Equipment is in Operation

The ARROW DRAIN TRAP
- Fully Automatic
- Operates Independent of Pressure
- Double Sump Action to Protect Valve

QUALITY PRODUCTS SINCE 1914
Catalog and engineering data on request.

ARROW TOOLS, INC.
1904 S. KOSTNER AVE. • CHICAGO 23, ILL.

When inquiring check 4824 opposite last page

Metal mesh reinforcing gives impact strength to plastic panel

Uses: For semi-transparent protection against flying particles and liquid spray; may also be used for protective skylights, windows.

Features: Panels have high impact resistance due to metal mesh reinforcement.

Description: Panels consist of 0.081 gage expanded aluminum embedded in flat glass-fiber-reinforced plastic, or 16-18 gage expanded steel embedded in similar sheets of plastic. Sheets are available in standard plastic and in special fire-retardant type. Panels can be clear, or ice blue, pale green, yellow, sky blue, and coral colors. Light transmission values range from 71% (clear) to 15% (coral). Average light transmission value is 50%.

Metal-reinforced plastic panel has high impact strength

("Security Junior" plastic panels are product of Resolite Corp., Dept. CP, Zelienople, Pa. . . . or for more information check 4825 opp. last pg.)

Fired-carbon seal face resists great heat, high faceloading

Uses: For sealing in all types of jet water pumps, oil pumps, and reduction units.

Features: Face of seal, capable of withstanding high

alphabetical index on page 244

. . . for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 244. "Quick-locator" starting on that page was a feature in **CHEMICAL PROCESSING** years ago. It means extra work for the Editors, but it helps you, the reader, in finding what you want . . . in a hurry!

NEW!

CUT PIPE ASSEMBLY COSTS with the new

QUIKUPL

STAINLESS STEEL PIPE FITTINGS
no threading, welding, or flaring needed

Quikupl's V-shaped seal ring in slotted groove grips tube as shown above, gives perfect, permanent connection. To assemble, simply cut tube or pipe to length, insert into fitting, and tighten clamps with an Allen wrench. That's all! Sealing action increases as pressure increases.

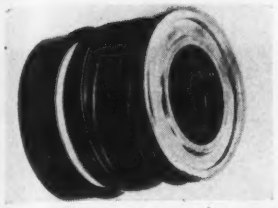
- For permanent installations, as strong and lasting as the tube itself.
- Quick and simple to assemble: cut pipe, insert into fitting, tighten clamp.
- Elimination of threads makes possible use of thin-wall OD tubing, with saving in material costs. *Both* OD and IPS pipe, however, can be used.
- 100% salvageable: ideal for installations requiring quick disassembly for cleaning or modification.
- Seals available in neoprene, butyl, and thiokol to handle wide variety of corrosives. Kel-F* on special order.
- Complete line of fittings: tees, ells, couplings, reducers, etc.

*KEL-F is reg. trademark of Minnesota Mining & Mfg. Co.

CATALOG Q100B tells whole story! Write for it today!

VANTON PUMP and Equipment Corp. • Hillside, N. J.
DIVISION OF COOPER ALLOY CORP.

When inquiring check 4826 opposite last page



Roll bellows of seal permits greater travel than the traditional V-seal bellows

face loading and heat, is made from filled true carbon to prevent porosity.

Description: Roll designed bellows is incorporated into self-contained, compact seal. It permits greater travel than V-seal bellows. Static O-ring is held firmly in groove within seal shell. It can be mounted on shaft from either direction. Seal is recommended to operate against pressures up to 100 psi. It is available for ⅝ and ¾" diameter shafts with general operating limitation of 212°F with shaft speeds up to 1000 fpm. Stationary seat is of high quality ceramic, set in Buna-N vibration ring.

(Seal is product of The Garlock Packing Co., Dept. CP, 400 Main St., Palmyra, N.Y. Check 4827 opp. last page.)

Bronze and steel valves

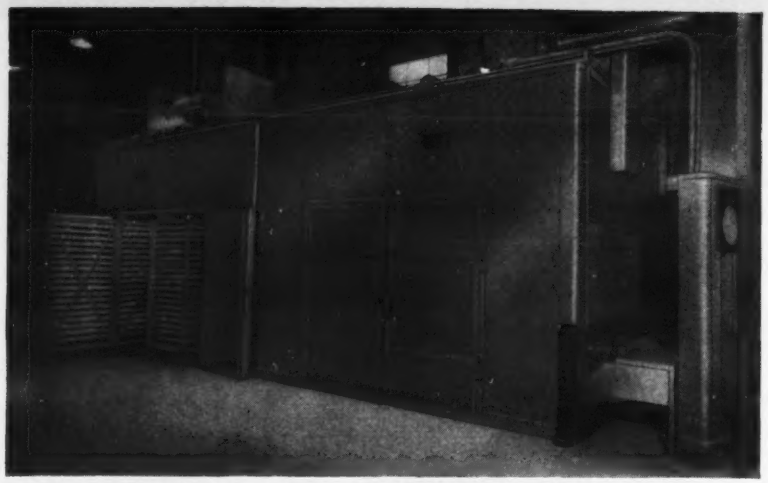
Catalog of 84 pages lists dimensions and material specifications for manufacturer's gate and globe valves of bronze and steel. Cat 200 — Manning, Maxwell & Moore, Inc., Dept. CP, Watertown, Massachusetts. Check 4828.

Motor selection guide

Data on manufacturer's line of 1/20- to 400-hp, polyphase, single-phase, and direct-current motors are presented in 12-page guide. By following directions of handy guide, motor type, dimensions, and other pertinent data can be determined in few moments. Application Guide 102 — Century Electric Co., Dept. CP, 1806 Pine St., St. Louis 3, Mo. Check 4829.

NOW...
you can make
MOISTURE TESTS IN MINUTES
with the fully automatic
IR MOISTURE -MATIC BALANCE
Tests anything that can be oven-dried... just load...set time and heat...and let the instrument do the rest.
IR
ALL the operator has to do is load the pan and set the timer and heat control to get quick, accurate, permanently recorded moisture readings of granular solids, pastes, liquids, waxes or anything else that can be dried by heat.
The portable IR Moisture-Matic, a product of Moore-Milford Corporation, utilizes far infrared for highest absorption and rapid, even heating, and has both a self-contained timer and variable heat control between 30 and 600 watts. The motor driven torsion balance automatically weighs the sample after the test, and the moisture percent is retained on a 3 digit counter to the nearest 0.1 percent. Operates on 115-volts, 60 cycles AC.
All components are of instrument quality to assure long life without maintenance expense. For guaranteed accuracy and speed in your moisture testing, ask your Scientific Products representative for a demonstration or write us today.
IR Moisture-Matic Balance complete, ready for use...
$325.00
S/P
Scientific Products—a single source for all laboratory supplies and equipment—offers a complete selection of moisture testers for every application.
Scientific Products
DIVISION OF AMERICAN HOSPITAL SUPPLY CORPORATION
New York • Chicago • Kansas City • Minneapolis • Atlanta • Washington • Dallas
Los Angeles • San Francisco

When inquiring check 4830 opposite last page



Recent Installation of Two "NATIONAL" Multi-Truck Chemical Dryers in Plant of Reheis Company, Inc., Berkeley Heights, N. J.

Quick, Uniform Drying of Fine Chemicals-in "NATIONAL" Truck Dryers

Featuring Wide Flexibility in Controlled Air Circulation.

Results from the operation of all "NATIONAL" Drying Equipment are invariably the same as in the Truck Dryer installation for the Reheis Company shown above—faster drying, under critical control of all drying factors, resulting in economical operation and improved product quality.

"NATIONAL" Truck Dryers are available in batch or tunnel types, with either cross or vertical circulation and in a wide variety of truck designs and arrangements. Tunnel type dryers with zone control and truck advancing mechanisms also available.

Heating of all "NATIONAL" Dryers may be steam, gas, oil (or other fuels) or electric. For gas heating, a special "NATIONAL" safety-engineered system is used which is highly rated by insuring companies.

Write for booklet completely describing "NATIONAL" Truck Dryers and their many advantages in the drying of all types of chemicals.

THE DRYING MACHINERY COMPANY
LEHIGH AVE. and HANCOCK ST., PHILADELPHIA 33, PA.

New England Agent. JONES & HUNT, INC., Gloucester, Mass.
Cable Address. "NADRYMA"—W. U. Code

When inquiring check 4831 opposite last page

Goodyear Tire & Rubber wanted a less expensive method of stopping motor winding failure due to carbon black penetration. By using resin impregnation . . .

motor insulation resists carbon black

THEODORE W. WETT,
Assistant Editor
With **JOHN GROTZINGER,**
Chief Electrical Engineer
The Goodyear Tire & Rubber Co., Inc.
Akron, Ohio

Problem: Fine-particle carbon black penetrated motor insulation through minute openings in varnish films and insulation barriers at Goodyear Tire & Rubber Co. Windings shorted and coils failed unless motors were provided with filtered air, and maintenance of a filtering system was costly.

For main drive motors, running approximately 800 hp, cost of fully enclosed units with built-in, air-water heat exchangers was considered justified. In other areas, batch-off mills, pelletizers, and extruders are driven by motors in 400-hp range. For this service company desired a less expensive unit . . . an open motor that would withstand carbon black infiltration.

Solution: Between three and four years ago Goodyear placed in service about 25 synchronous motors in 400-hp range. These units have windings protected with Thermalastic insulation. Large mica splittings are bonded either into a tape or wrapper, depending on size and shape of coil to be wound, with a strong resilient synthetic resin. Completely insulated coil is vacuum- and pressure-impregnated with a solventless, heat-reactive, synthetic resin and then cured at an elevated temperature. Impregnation process with solventless resin produces a fill and consolidation of insulation.

Excellent wetting characteristics, plus low viscosity of resin, results in a void-free, thoroughly consolidated insulation. Complete chemical reaction of resin, without sol-

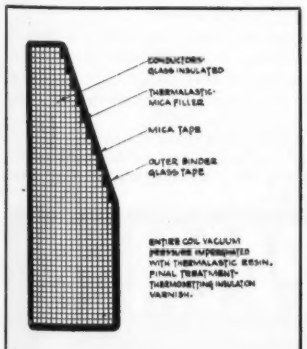
Thermalastic insulation keeps this 400-hp, open synchronous motor (arrow) operating despite severe conditions of dual mill application

arbon black attack

vent evaporation during processing, assures that no voids are created within insulation while heat reaction takes place.

Results: Motors have served successfully, without a winding failure, since placed in op-

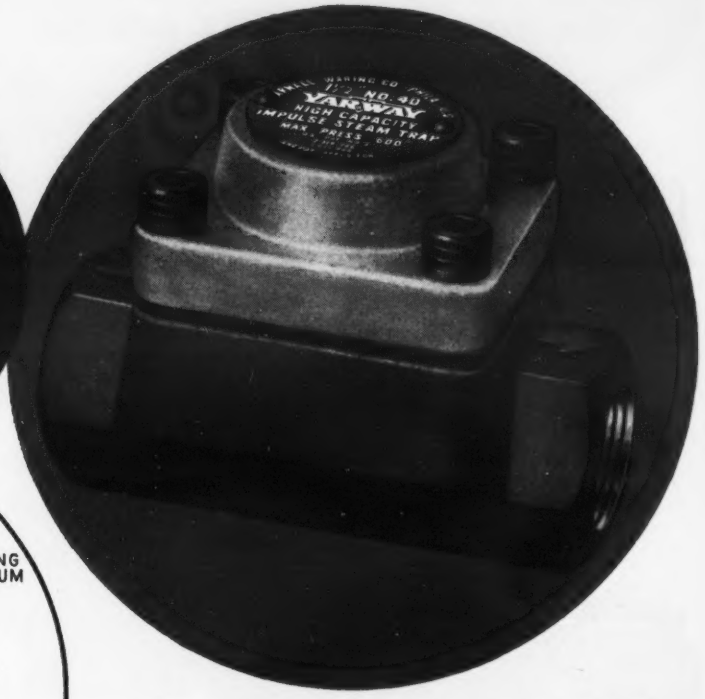
Turn to next page

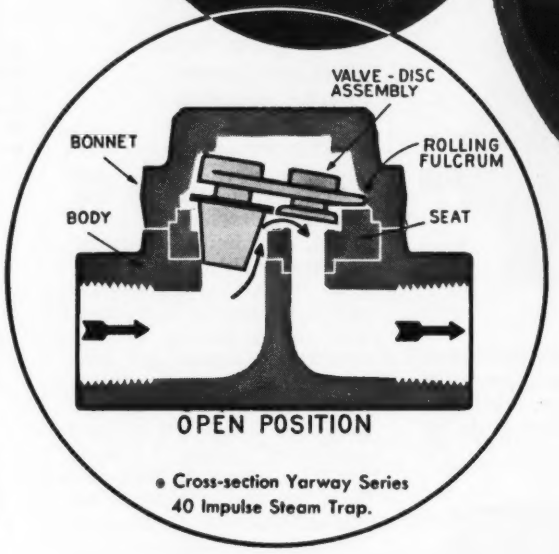

CONDUCTORS-GLASS INSULATED
THERMALASTIC-MICA FILLER
MICA TAPE
OUTER BINDER GLASS TAPE
ENTIRE COIL VACUUM PRESSURE IMPREGNATED WITH THERMALASTIC RESIN. FINAL TREATMENT-THERMOSETTING INSULATION VARNISH.

Cross-section view of stator coil having Thermalastic insulation which resists attack by carbon black

This YARWAY IMPULSE STEAM TRAP is for extra heavy condensate loads

YARWAY SERIES 40





• Cross-section Yarway Series 40 Impulse Steam Trap.

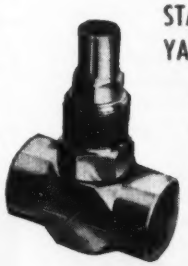
The famous Yarway "impulse" principle of thermodynamics that revolutionized steam trapping many years ago, is now applied to a steam trap for extra heavy condensate loads—the Series 40 Impulse Steam Trap. Users report with this trap they obtain quicker heating, higher and more even temperatures in their process equipment.

It also incorporates all the other advantages of earlier Impulse trap designs, such as—immediate response to load changes, no air binding, light weight and small size. Maintenance is low, thanks to stainless steel body and working parts.

High condensate capacity of Yarway Series 40 Impulse Steam Traps makes them ideal for heavy condensate loads on large autoclaves, cooking kettles, dryers, heat exchangers, heating coils, presses, unit heaters, etc.

Suitable for all pressures up to 600 lbs. maximum, without change or adjustment. Operates against back pressures up to 50%. Five sizes, ½", ¾", 1½", 2" and 2½".

Your Yarway man will furnish a Yarway "40" for 90-day free trial in your plant without obligation, or write for Yarway Bulletin T-1746.



STANDARD SERIES 60 YARWAY IMPULSE TRAP

For normal steam trap applications the standard Series 60 Yarway Impulse Steam Trap is recommended. For *extra light* condensate loads use the Yarway 20-A Impulse Steam Trap.

Both are described in Yarway Bulletin T-1739X.

YARNALL-WARING COMPANY
125 Mermaid Avenue, Philadelphia 18, Pa.

YARWAY **IMPULSE® STEAM TRAP**

OVER 1,000,000 YARWAY IMPULSE STEAM TRAPS USED

When inquiring check 4832 opposite last page

Motor Insulation

Starts on page 214

eration. In addition to fine-particle carbon black, winding insulation has withstood usual variations in humidity, and oil and grease film deposits. Resin impregnant makes insulation resistant to attack by ordinary solvents, lubricating oils, and weak acids and alkalis.

(Motors with Thermalastic insulation were supplied by Westinghouse Electric Corp., Dept. CP, Pittsburgh, Pa. . . . or for more information check 4834 on form opposite last page.)

Air magnetic device gives sure control of tube expander

Action stops at pre-set torque

Uses: Rolling tubes in boilers, heat exchangers, evaporators, and similar equipment.

Features: Unit has permanent magnet giving positive and instantaneous engagement and disengagement between driving mechanism and driven expander.

Description: Tool is 10½" long and weighs 10 lb. It is air-driven, making it suitable for rolling tubes in hazardous locations. Sensitive, easily adjusted calibrating dial permits exact settings for torque control. Positive drive action stops instantaneously when pre-set torque is reached.

After disengagement of expander, motor runs free, cutting required stops and starts in half. On-off locking switch and separate reversing trigger permit uninterrupted sequence of operation. Quick-release chuck locks expander securely, yet allows snap motion insertion or removal. Control operates on 28 to 30 cfm of air at 90 psig. Single ⅜" air hose is only connection required.

(Air magnetic control for tube expander is product of Elliott Co., Inc., Dept. CP, Jeannette, Pa. . . . or check 4835 on form opposite last page.)

Rotary AIRLOCK FEEDERS

for practically EVERY process requirement

STANDARD DUTY

For low pressure dust control systems where the pressure differential ranges from 0 to 12" w.g. Available in 6", 8" and 10" sizes—cast iron construction and rotors equipped with renewable wiper strips; with or without drives.

HEAVY DUTY

For higher pressure dust control or pneumatic conveying systems where pressures may range up to 5 to 10 psi. Features life time lubricated sealed ball bearings and special shaft seals for heavy, continuous service. Built in 6", 8", 10" and 12" sizes; with or without drives.

BLOW-THRU

Ideal for feeding flour or any similar product into pneumatic conveying lines, against pressures up to 15 psi. Built in 8" and 10" sizes serving 2" and 3" conveying lines respectively. Available with or without drives.

Bulletin P-55 contains complete specifications and data—sent promptly upon request.

PRATER

Foremost Builder of Rotary Airlocks

PRATER PULVERIZER COMPANY

1513 SO. 55th COURT • CHICAGO 50, ILL.

When inquiring check 4833 opposite last page

PALMER

MERCURY ACTUATED

DIAL THERMOMETERS

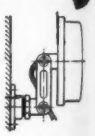
in 3 types to suit any requirements

PATENTED

Full 4½" dial face. Stem can be placed at any angle and case can be rotated to any readable position.

1 **Rigid Stem Dial Thermometer** tapered bulb, interchangeable with standard industrial thermometer separable socket. (As illustrated above.)

2 **Wall Mounted Dial Thermometer** with flexible connecting armor. Case adjustable to easy reading position.



3 **Flush Mounted Dial Thermometer** for panel mounting with flexible connecting armor.

All three types have a full 4½" dial face.

for accuracy: Mercury actuated . . . Fully Compensated by Invar Compensaton. Guaranteed Accurate 1 scale division.

for angularity: Can be adjusted to most readable position at any angle desired.

for readability: Bold Black Numbers . . . 11" of scale Reading Dial face can always be placed in easiest readable position.

for interchangeability: Always specify "PALMER" Separable sockets as they are interchangeable for Dial or Industrial type Thermometers.

PALMER

THERMOMETERS, INC.

Norwood Ave., Cincinnati 17, Ohio

Mfrs. of Industrial Laboratory Recording and Dial Thermometers

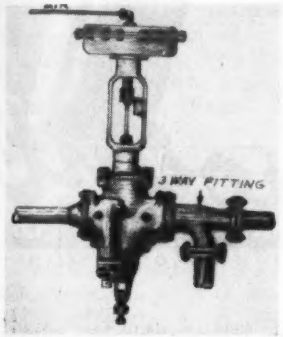
When inquiring check 4836 opposite last page

Seats can be replaced with valve in line under pressure

Unit combines control valve with shut-off, by-pass

Uses: As diaphragm control valve for chemical and petroleum industries.

Features: Unit combines, in one valve body, repair and arrangement principles of control valve, together with stream flow shut-off and by-pass devices.



Control valve unit eliminates extra valves and pipe

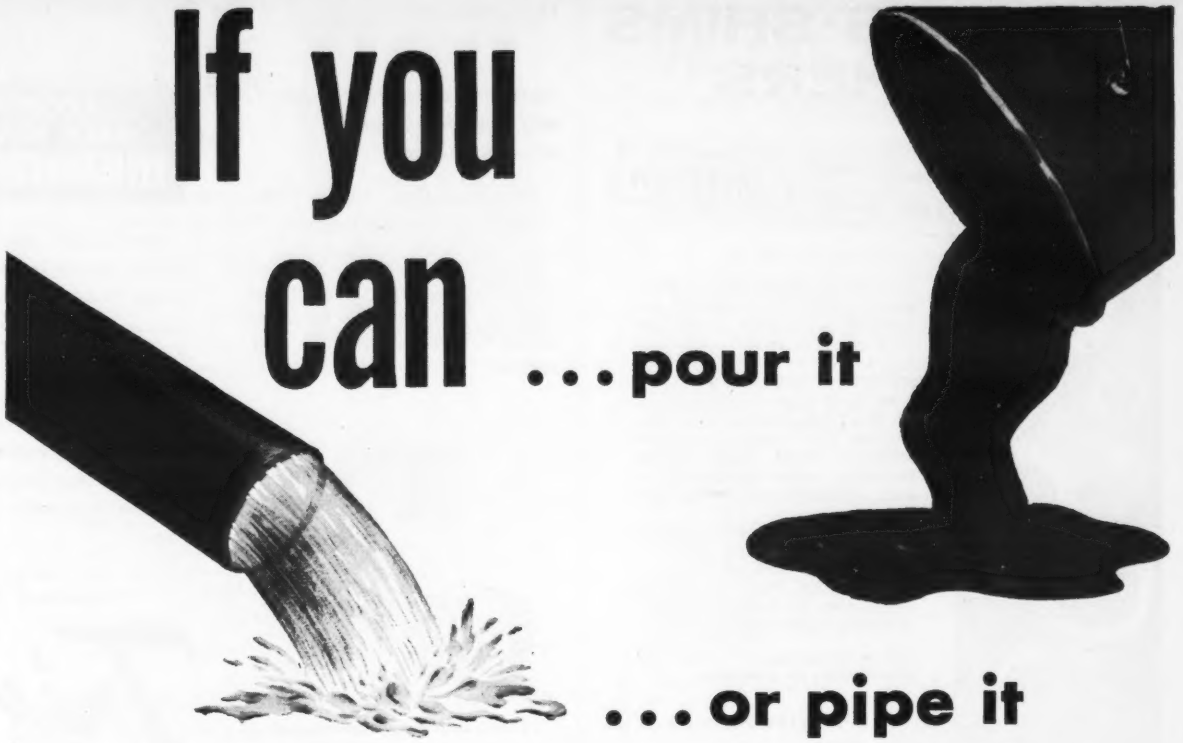
Description: Unit is designed so that repair or replacement of valve seats or change from normally open to closed valve position can be accomplished with valve in line and operating under pressure. All inner parts are interchangeable between company's diaphragm control valve and diaphragm control valve unit. Addition of three-way fitting and inner valves converts unit into three-way installation.

(Control Valve unit is product of Elsey Corp., Dept. CP, Drawer 841, Bartlesville, Okla. . . . or check 4837 opposite last page.)

Ventilating equipment

Bulletin of 20 pages presents illustrations, features, dimensional and performance data on manufacturer's line of industrial fans. Industrial fan bul — Power Line Fan Co., Dept. CP, Plainfield, N.J. Check 4838.

If you can . . . pour it



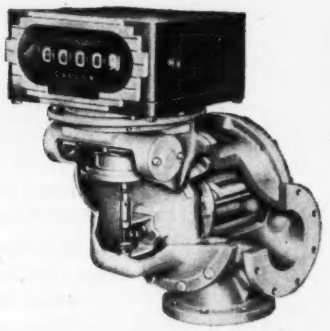
. . . or pipe it

ROCKWELL CAN METER IT!

including corrosive liquids

Did you know that your company can save important money by using modern measurement methods in handling industrial liquids? With Rockwell meters you can batch, blend and control formulas with precision. You can guard your costly liquid inventories. You can control costs. And with Rockwell automatic quantity control valves you can save time and money on repetitive operations.

Why not investigate all the advantages of liquid metering in your plant? There's a size and type Rockwell meter for practically every service. Use the coupon or write for a free engineering analysis of your liquid handling operations.



ROCKWELL ROTOCYCLE METER
Cutaway to show the all-revolving rotor construction

ROCKWELL
Industrial
METERS

STAINLESS STEEL • STEEL • IRON • BRONZE

CLIP COUPON—MAIL TODAY

ROCKWELL MANUFACTURING COMPANY Dept. 106G
Pittsburgh 8, Pennsylvania

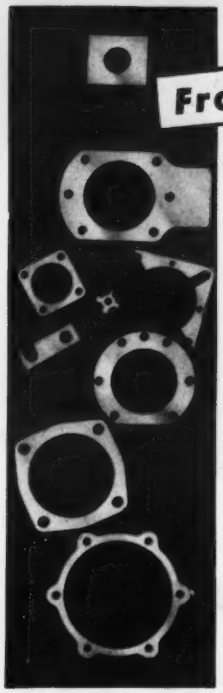
Gentlemen:
I am interested in measuring _____
(Name of Liquid)

Pipe Size _____"
Working Pressure _____psi Temperature _____°F max.
Max. Flow Rate _____gpm Min. Flow Rate _____gpm

Your Name _____
Company _____
Street _____
City _____ Zone ____ State _____

When inquiring check 4839 opposite last page

GASKETS · SHIMS WASHERS



From 1 to 1 Million

No matter what type, thickness, shape or quantity required, you can count on Chicago-Wilcox for uniformly accurate gaskets, shims, washers or special stampings.

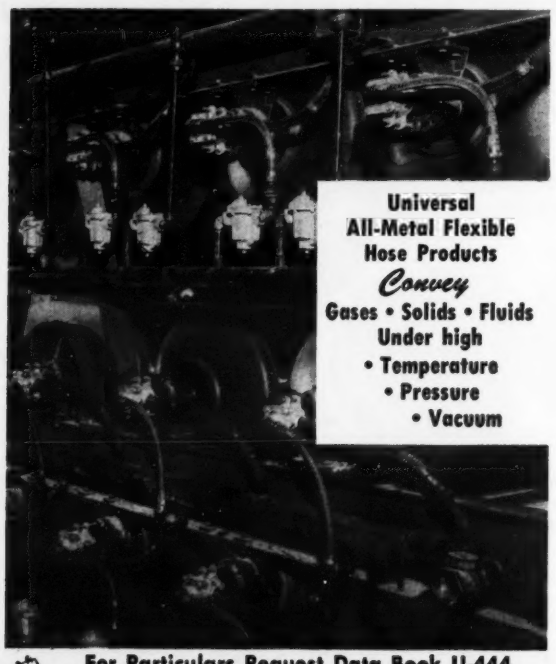
With 50 years accumulation of dies, chances are we can furnish just what you need without a die charge—thus reducing costs substantially and assuring on-schedule delivery.

Gaskets, shims and washers can be supplied in metallic, non-metallic and plastics . . . teflon, nylon, etc. . . . and in quantities to meet your production requirements.

Write for catalog and submit your specifications for quotation.

CHICAGO-WILCOX MFG. CO.
7717 South Avalon
Chicago 19, Illinois

When inquiring check 4840 opposite last page



Universal All-Metal Flexible Hose Products *Convey* **Gases • Solids • Fluids Under high • Temperature • Pressure • Vacuum**

For Particulars Request Data Book U-444

Quality . . . ALL METAL FLEXIBLE HOSE PRODUCTS

UNIVERSAL METAL HOSE CO.

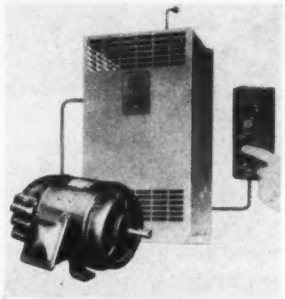
2189 South Kedzie Avenue, Chicago 23, Illinois

When inquiring check 4841 opposite last page

Variable-speed drive has wide speed range, precise control

Operates from 23 to 2300 rpm from rheostat control

Uses: As a drive for all machine applications requiring precise control of variable speed, including inching and jogging.



Variable-speed drive operates on any plant AC power line

Features: At twist of a simple rheostat control, drive will operate from as low as 23 rpm, for intermittent set-up duty, up to 2300 rpm for high-speed production. Printed circuit board reduces chance of failures.

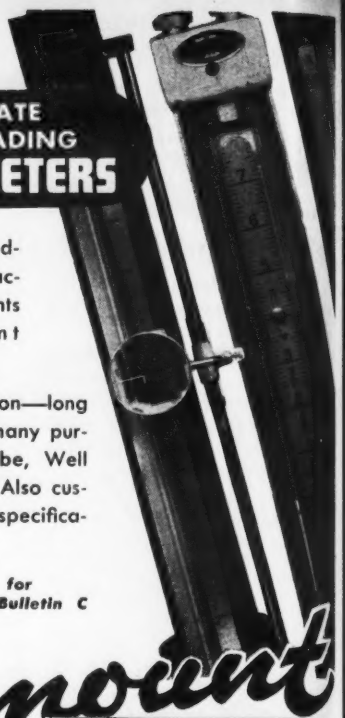
Description: Drive consists of a rectified power-control panel, an operator's station, and a variable-speed drive motor. Unit is available in 220-volt and 440-volt models in sizes from ¾ through 4 hp. It plugs into any plant AC power line.

(Reliance V*S Jr. drive is a product of Reliance Electric and Engineering Co., Dept. CP, 24701 Euclid Ave., Cleveland 17, Ohio . . . or for more information check 4842 on form opposite last page.)

Jacketed fittings, pipe

Catalog folder of 14 pages contains specifications and price information on manufacturer's line of cast iron and steel steam-jacketed pipe and fittings. Jacketed pipe and fittings cat — Red Jacket Company, Inc., Dept. CP, 500 Bell Ave., Carnegie, Pa. Check 4843.

ACCURATE EASY READING MANOMETERS



For precise reading as well as for accurate measurements choose Trimount Manometers.

Sturdy construction—long lasting—used for many purposes—Multiple Tube, Well Type, U Tube, etc. Also custom made to your specifications.

Write for Illustrated Bulletin C

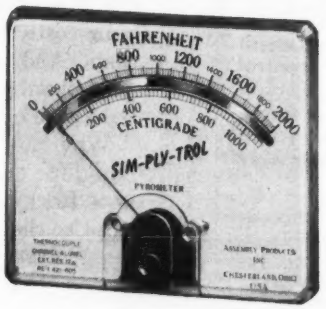
Trimount INSTRUMENT CO.

3119 WEST LAKE STREET • CHICAGO 12, ILLINOIS

When inquiring check 4844 opposite last page

SIMPLYTROL INDICATING PYROMETERS

Twenty-one ranges for temperatures from −400° F. to + 3000° F. Accuracy 2% of full scale.



Prices from $20.25 to $51.65

Model 451: 4½" clear plastic case, 0/2000°F., with mirror scale.

6 other sizes and case styles.

Medium resistance (4 ohms per millivolt) thermocouple millivoltmeter. Compensated for cold junction and copper error.

Available with 1% accuracy. Can be thermistor compensated for ambient changes. Some styles supplied with mirror scales.

Delivery: Many models in stock. Others, allow 4 - 5 weeks.

Ask for 40-page catalog 4-B which shows indicating and controlling pyrometers.

Assembly Products, Inc., Chesterland 36 Ohio.
Phone (Cleveland, O.) HAmilton 3-4436.

(West Coast: P. O. Box XX Palm Springs, California. Phone DHS 4-3133 or 4-2453. Los Angeles: 2336 Mardina St., W. Covina, California. Phone EDgewood 9-2670.)

Booth 2919, WESCON SHOW, Aug. 20-23, Cow Palace, San Francisco

When inquiring check 4845 opposite last page

Material, space savings with high-peak-energy ceramic magnet

Area is only 57% of conventional ceramic magnets

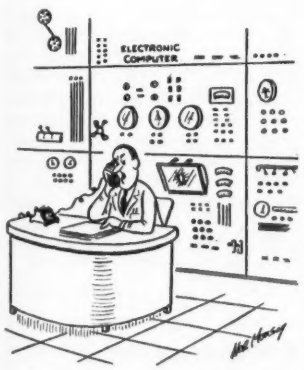
Uses: As oriented ceramic permanent-magnet material.

Features: Material produces a product having a very high peak energy, and makes possible saving of magnetic material and space.

Description: Ferrite magnetic material, oriented in direction of pressing, produces peak energy product of approximately 3.5 x 10^6, 3½ times stronger than present ceramic magnets. Weight of product is 0.181 lb/cu in. Its area is only 57% of conventional non-oriented ceramic magnets.

Properties include coercive force (H_c) of 2000 oersteds and residual induction (B_r) of 3840 Gauss. At point of peak energy product, B_d is 1920 Gauss and H_d is 1820.

(Indox V is available from The Indiana Steel Products Company, Dept. CP, Valparaiso, Ind. . . . or for more information check 4846 on form opposite last page.)



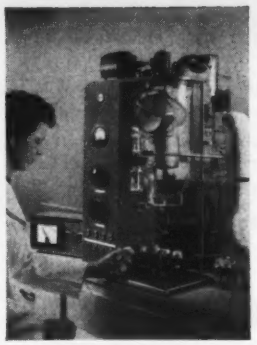
"Stop phoning me, son—I'll do your arithmetic homework as soon as I get a chance!"

Thanks to Harold Money, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware

DISTILLATION

Now you can

- Distill heat-sensitive, labile materials with molecular weights as high as 1200.
- Work with less danger of thermal decomposition than with any other distillation method.
- Evaporate materials almost instantly at a film thickness of .01 millimeter.



CEC molecular still—Model CMS-5

...with new CEC centrifugal molecular stills

Now you can get a still that's simple to operate, easy to control. A still that provides truly economical laboratory and pilot-plant distillation of heat-sensitive materials.

Your choice of two models—the CMS-5 (illustrated) and the larger CMS-14. Capacities from 100 cc to 5 gallons. Distillation rates from .03 gm. per minute to 1½ gal. per hour.

Both stills are sold on a royalty-free basis for noncommercial uses.

Write for our new Brochure No. 3-1 on high-vacuum distillation.

Consolidated Electrodynamics
Rochester Division, Rochester 3, N.Y.
formerly Consolidated Vacuum

OFFICES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

When inquiring check 4847 opposite last page

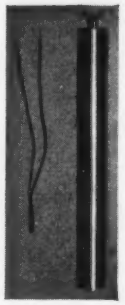
ON THE SPOT HEAT
to your exacting requirements!

TRENT STRIP HEATERS

for Ovens, Dryers, Kettles, Process Equipment

- Flat Metallic Tube Casing
- Ceramic Block Terminal Blocks
- No Grooves—No Heat Distortion
- Sealed End Construction

Available in a complete range of types and sizes, wattage requirements, and voltage conditions—for maximum safe surface temperatures of 750°F. and 1000°F!



TRENT CARTRIDGE HEATERS

for Dies, Molds, Platens, Sealers, Defrosting

- Brass or Steel Sheath Construction
- Silver Soldered End Opposite Terminals
- Moisture and Wax Resistant
- Nickel Chromium Heater Coil Sealed in Ceramic Insulation
- Brass Angle, Pigtail, Rod, or Stud Type Terminals

Standard sizes from ⅜" to 1⅜" diameter, and 1½" to 22" in length, are supplied in a range of wattage requirements for 110 and 220 volt operation.

Discuss your spot heating requirements with a Trent representative.

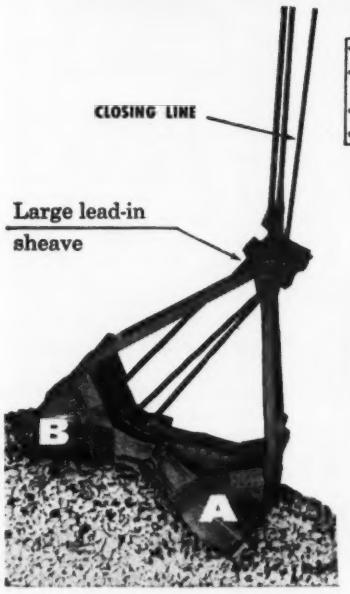
Trent Representatives in Principal Cities Coast to Coast

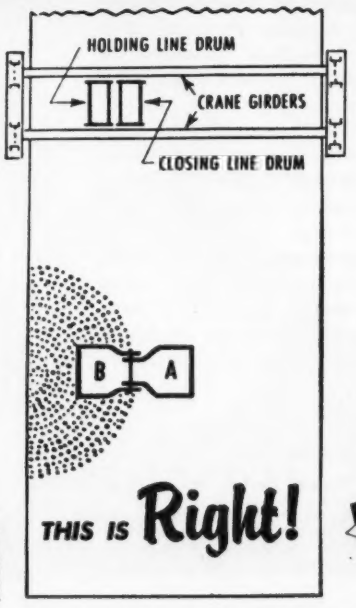
TRENT INC.
Electrically Heated Industrial Equipment
242 LEVERINGTON AVE., PHILA. 27, PA.

When inquiring check 4848 opposite last page

AMAZING CABLE LIFE INCREASES

reported by leading users of chemical and fertilizer buckets





These increases are the result of applying the practical recommendations, graphically presented with fourteen illustrations of right and wrong bucket applications in Blaw-Knox Bulletin 2510.

This bulletin illustrates and describes proper and improper relationship between:

1. The preferred or required direction of bucket opening.
2. Location and contours of the piles of materials.
3. The position of the holding and closing drums in the overhead crane trolley.

An understanding of this relationship has invariably lead to marked improvement in cable life and bucket performance. Send for your copy of form 2510 today.

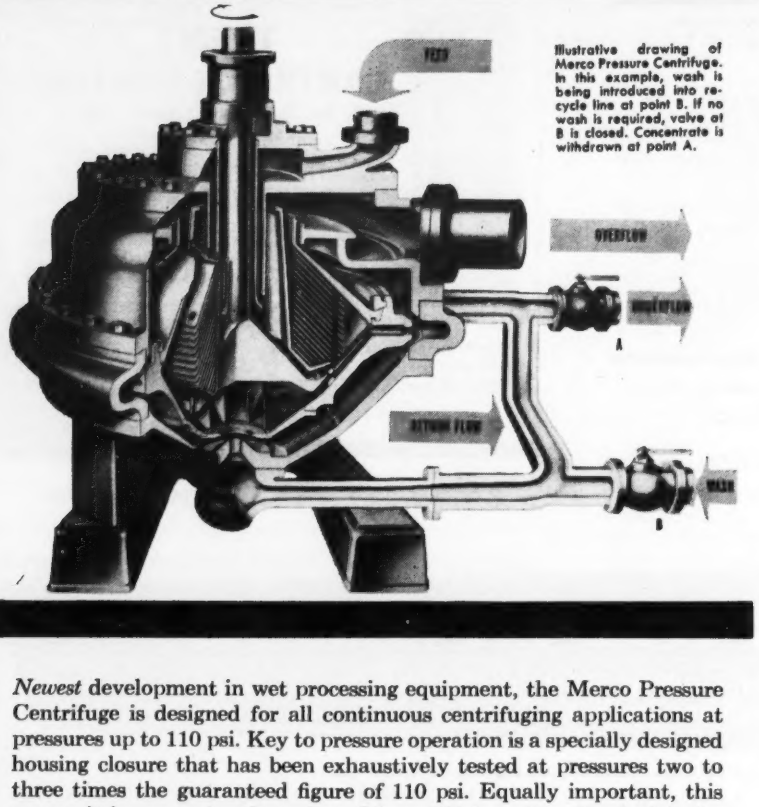
BLAW-KNOX COMPANY
BLAW-KNOX EQUIPMENT DIVISION
Pittsburgh 38, Pa.
Offices in Principal Cities

When inquiring check 4849 opposite last page

NOW

Centrifugal Separations under pressure conditions with the new

Merco Pressure Centrifuge



Illustrative drawing of Merco Pressure Centrifuge. In this example, wash is being introduced into recycle line at point B. If no wash is required, valve at B is closed. Concentrate is withdrawn at point A.

Newest development in wet processing equipment, the Merco Pressure Centrifuge is designed for all continuous centrifuging applications at pressures up to 110 psi. Key to pressure operation is a specially designed housing closure that has been exhaustively tested at pressures two to three times the guaranteed figure of 110 psi. Equally important, this new unit incorporates the unique Merco "Return Flow" principle for maximum operating flexibility. Under centrifugal forces thousands of times higher than gravity, even the smallest particles in the feed "sink" rapidly outward and are continuously expelled through fixed open nozzles in the rotor. A controlled portion is withdrawn as finished concentrate and the remainder becomes a return flow to the rotor. Wash, if desired, is introduced to the return flow line . . . clear, excess liquor overflows out the top of the unit.

If there's a step in your flowsheet involving concentration, washing, clarification, soluble recovery, or classification *under pressure*, there is a good chance that this new tool will prove useful. Bulletin No. 2600, just off the press, describes the Merco Pressure Centrifuge in detail. For your copy, write Dorr-Oliver Incorporated, Stamford, Conn.

Merco T.M. Reg. U. S. Pat. Off.

DORR-OLIVER
INCORPORATED
WORLD-WIDE RESEARCH · ENGINEERING · EQUIPMENT
STAMFORD · CONNECTICUT · U.S.A.

When inquiring check 4850 opposite last page

CP NEW LITERATURE

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheets, etc., are found throughout other sections of this magazine

Chase corrosive fumes

Importance and use of corrosive-fume ventilation equipment is described in 10-page reprint. Recommended exhaust rates, procedures, air flow charts, types of systems, and types of fume removal equipment and their applications are covered. "Corrosive Fume Ventilation Equipment" — Heil Process Equipment Corporation, Dept. CP, 12901 Elmwood Avenue, Cleveland 11, Ohio. Check 4851.

Glassware catalog

Illustrations, descriptive information, and prices of laboratory glassware are contained in manufacturer's 234-page catalog. Cat TG-15 — Kontes Glass Company, Dept. CP, Vineland, New Jersey. Check 4852.

Controllers, stations

Application and operating data on manufacturer's controllers and control stations are presented in 18-page bulletin. Bul 5013 — Moore Products Co., Dept. CP, Philadelphia 24, Pa. Check 4853.

Pallet dollies, conveyors

Dimensions, weights, and capacities of pallet dollies and roller conveyor sections are listed in eight-page bulletin. Illustrations show construction features and uses of equipment. Bul 700B — Samuel Olson Mfg. Co., Inc., Dept. CP, 2418 Bloomingdale Ave., Chicago 47, Ill. Check 4854.

Batch control systems

Schematic wiring diagrams that aid in telling how company's batch control systems operate are included in four-page catalog. Specifications augment drawings and explanation. Cat 91-109 — Fischer & Porter Co., Dept. CP, Hatboro, Pa.

Sulfonic acid data

Formulas and procedures for preparing various customized salts of Sulfonic Acid AA (dodecylbenzene sulfonic acid) are presented in four-page data sheet. Bul A-3 — Tennessee Corp., Dept. CP, 1330 W. Peachtree St., Atlanta 9, Ga. Check 4855.

Features drum agitator

Simple procedure for mounting manufacturer's drum agitator in threaded bung of standard 55-gal drum is described in two page data sheet. Handy chart gives recommended agitation time for full range of specific gravities encountered in liquid chemical mixtures. Data Sheet 2 — Prenco Products, Inc., Dept. CP, 507 E. 10 Mile Rd., Hazel Park, Mich. Check 4856.

Temperature control bul

Functions, uses, and advantages of centralized automatic temperature control are described in eight-page, four-color booklet. Bul F8031 — Barber-Colman Company, Dept. CP, 1400 Rock St., Rockford, Ill. Check 4857.

Table suggests cement for corrosive service

Recommendations for application of impervious graphite and resin-base cements in corrosive service are presented in table in four-page bulletin. Included are concentrations and maximum fluid temperatures for acids, alkalis, salt solutions, organic compounds, halogens, air, water, and various mixtures. Cat Section S-5050 — National Carbon Company, Division of Union Carbide Corporation, Dept. CP, 30 East 42nd St., New York 17, N.Y. Check 4858.

Lift-truck attachments

Specifications for manufacturer's line of clamping attachments for lift trucks are described in eight-page bulletin. Photographs show clamps, side-shifting clamps, rotators, and rotating clamps. Bul 387 — Buda Division, Allis-Chalmers Mfg. Co., Dept. CP, Milwaukee 1, Wis. Check 4859.

WANT MORE INFORMATION . . .

. . . about things you read about in the New Literature Section?

Here's How to Get It

Note the number in last line of each new literature review. Check this key number on Reader Service Slip opposite last page of this issue. Fill in the Slip with the other pertinent information (name, title, company, address, product made). Mail to our Reader Service Department.

We'll contact the manufacturer for you, telling him you'd like a copy of the bulletin. He'll send it direct to you.

Quality
Uniformity
Dependability
You get all 3 in ---
WELDCO
PIPE
AND
TUBING
WELDCO is produced by tubing specialists . . . men who have the equipment, facilities, and experience to manufacture top-quality Pipe and Tubing —consistently uniform, always dependable!
Only WELDCO is welded with the exclusive Double-Fusion process. It's available in Stainless Steel, Monel, Inconel, Nickel, Cupro-Nickel, Hastelloy, and Titanium in tube and pipe sizes from 3" to 30", Schedules 5, 10, and 40. To get top-quality, dependable products, make Youngstown Welding your tubing headquarters. A letter or phone call puts our 30 years of specialized experience to work for you.
Whatever Your Needs In Tubing . . .
You're 'Way Ahead With WELDCO
WELDCO
THE YOUNGSTOWN WELDING & ENGINEERING CO.
3724 OAKWOOD AVE. . YOUNGSTOWN 9, OHIO
When inquiring check 4860 opposite last page

For Man-Cooling!

Coppus Airplane Type Heat Killer® **cools large areas — restores efficiency**

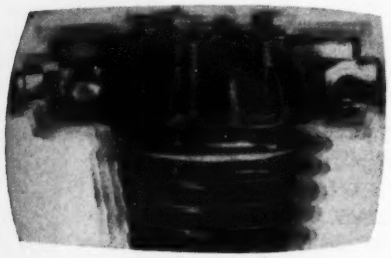
HEAT KILLER on the job in drop forge plant.

Steel mills, drop forge plants, foundries and other plants with hot working conditions find this Coppus Heat Killer increases worker efficiency . . . at reasonable cost. *A single fan cools large areas.*

Other types also available for cooling furnaces, electrical equipment, for driving out gases, drying out products, drawing out fumes. Write now for detailed information. **COPPUS ENGINEERING CORPORATION, 387 PARK AVENUE, WORCESTER 2, MASSACHUSETTS.**

ANOTHER **COPPUS** "BLUE RIBBON" PRODUCT

When inquiring check 4861 opposite last page



VIBRATION DOES NOT CRACK OR FISSURE THE PLASTIC SEAL

for those hard-to-hold liquids and gases

Leak Lock is a truly remarkable joint sealer, as its plastic base holds chemical solutions and gases that quickly penetrate ordinary sealers.

Leak Lock adheres firmly to most surfaces . steel, iron, copper, aluminum, cork, asbestos, plastics, etc., and stays flexible indefinitely. It is the real answer to those difficult leaking joint problems. Highside Chemicals, Incorporated, 16 Colfax Ave., Clifton, N. J.

Send for FREE SAMPLE for test purposes

Leak Lock

When inquiring check 4862 opposite last page

NEW LITERATURE

Nonionic surface-active

Wetting and rewetting properties of nonionic surface-active agent are described in four-page bulletin. Effect of builders on its detergent value, and its good compatibility with other chemicals are discussed. Properties on cotton and wool are reported. Recommendations are given for use in paper field. Bul 132 — Arnold, Hoffman & Co., Inc., Dept. CP, 31 Canal St., Providence 3, R.I. Check 4863.

Radioactivity measuring

Over 30 new radioactivity measuring instruments are illustrated in manufacturer's 64-page catalog. Four-color insert describes and illustrates typical instrumentation for a nuclear biochemical laboratory, industrial nuclear research laboratory, and four typical medical radioisotope laboratories. Cat Q — Nuclear-Chicago Corporation, Dept. CP, 229 W. Erie Street, Chicago 10, Ill. Check 4864.

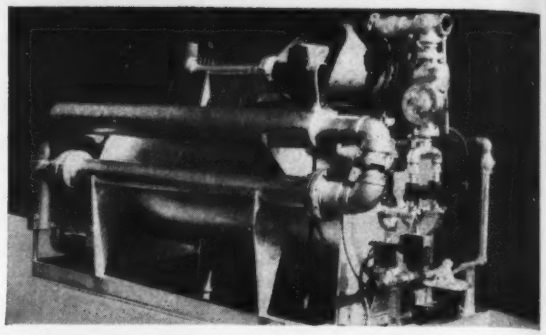
Up-to-date catalog on conveyors

Specifications, capacities, instruction data, and installation information and photographs on gravity wheel conveyors are contained in 16-page catalog. Various wheel arrangements for steel and aluminum conveyors are shown. Cat SA-102A-1 — Sage Equipment Company, Inc., Dept. CP, 30 Essex St., Buffalo 13, N.Y. Check 4865.

Canadian fertilizer plant

How six process units convert natural gas, air, water, sulfur, and phosphate rock to ammonium nitrate and ammonium phosphate fertilizers in Canadian fertilizer plant is told in 16-page brochure. Chronological treatment of plant's construction is presented. "Chemical Fertilizers for Canada's West" — The M. W. Kellogg Co., Dept. CP, 711 Third Ave., New York 17, N. Y. Check 4866.

3 Basic Types Of STRAUB GAS GENERATORS



■ Fully automatic STRAUB Gas Generators are available in three basic types — Exothermic, Endothermic and Nitrogen. Built to produce inert or equilibrium gases to protect your plant, product or process.

Compact and rugged, they feature a special precision compressor-carburetor system which permits highly accurate and uniform control of the gas produced. If your process calls for low cost controlled atmosphere, be sure you check STRAUB.

Complete Catalog. Get your copy of this descriptive catalog.

A. A. STRAUB COMPANY, INC.
4930 Grayton Rd. • Cleveland 11, Ohio

When inquiring check 4867 opposite last page

CUT COSTS ON EVERY CLEANING JOB WITH —

COLD STEAM

Precise control of air and water blasts heavy dirt or rinses sheets and small parts with a heavy, penetrating spray

HYDRO-AIR
PRESSURE WASHER

- NO BACK SPLASH!
- BLASTS STUBBORN DIRT!
- HARMLESS TO FINEST FINISH!

$9.95

HYDRO-AIR Pressure Washer connects to regular air and hot or cold water supply. Composition rubber sleeve which fits over handle protects user's hand when hot water is used.

Inquiries invited from industrial cleaning compounders interested in resale.

D & M PRODUCTS, INC.
76 N. Raymond Ave. Pasadena 1, Calif.

When inquiring check 4868 opposite last page

Use of strain gages

Flat grid, fine pitch, bakelite gages are among products contained in manufacturer's 16-page price list on strain gages. Methods of use and proper selection are thoroughly discussed. Gages, instruments, and accessories price list — Electronics and Instrumentation Div., Baldwin-Lima-Hamilton Corp., Dept. CP, Waltham, Mass. Check 4869.

Radioactivity detectors

Manufacturer's line of laboratory survey meters for detecting radioactivity are described in four-page bulletin. Bul GS-57 — Nuclear Measurements Corporation, Dept. CP, 2460 N. Arlington Ave., Indianapolis 18, Indiana. Check 4870.

Magnetic shielding info

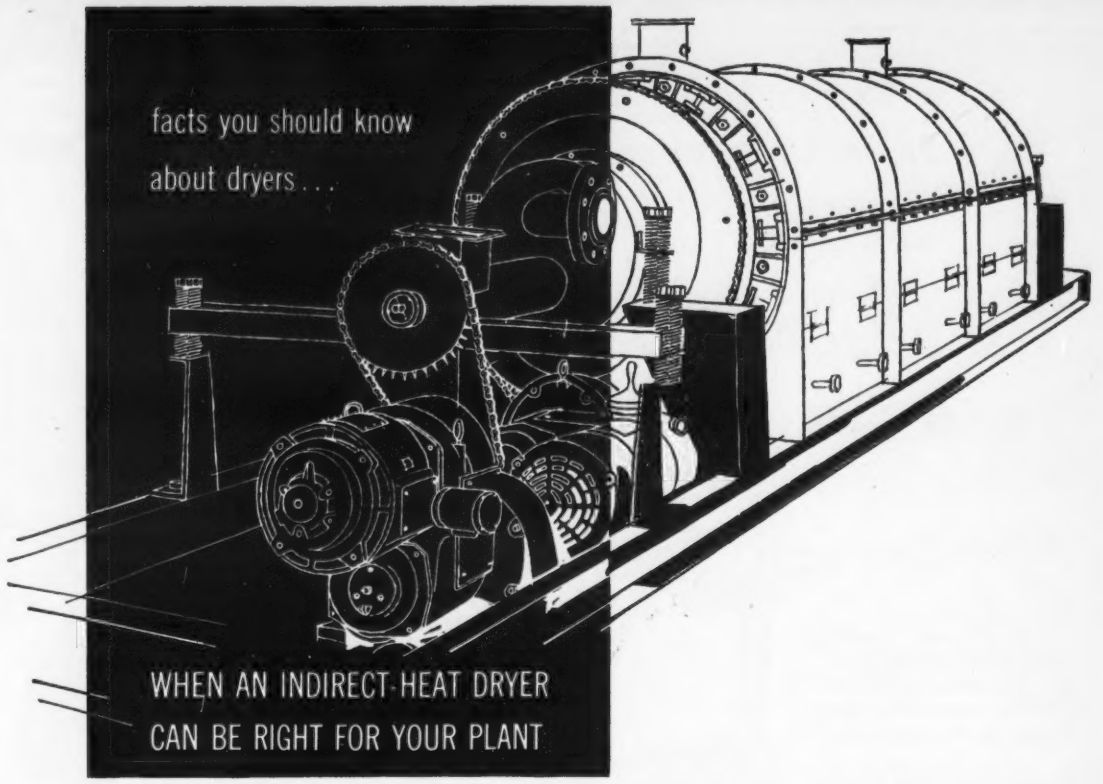
Seven pages of graphs are featured in 20-page bulletin describing advantages and methods of fabricating non-shock sensitive non-retentive magnetic shielding material. Bul 122 — Magnetic Shield Division, Perfection Mica Company, Dept. CP, 20 N. Wacker Dr., Chicago 6, Ill. Check 4871.

Tall oils

Four-page, pocket-size pamphlet gives description and specs of tall oils. Tall oil pamphlet — Welch, Holme & Clark Co., Inc., Dept. CP, 1 Hudson St., New York 13, N.Y. Check 4872.

Truck and floor cranes

Dimensions and capacities of company's line of hydraulic cranes are listed in two-page bulletin. Detailed tables present specifications for truck cranes and eight floor cranes. "Tubar Cranes" bul — Tubar Crane Division, Uhrden, Inc., Dept. CP, Dennison, Ohio. Check 4873.



For over 55 years, Louisville Dryers have been solving industry's drying problems and effecting marked economies. The records of this experience can often be applied to specific cases, possibly yours. For example . . .

Q. *My material is a filter cake, practically all minus 325 mesh, and must not contact furnace gases. It can be heated to 500° F. at least, without injury. What type of dryer would do the job best?*

A. You might consider using a direct-heat rotary dryer that utilizes clean, heated air as the drying medium—air heated by steam coils or a gas or oil fired heat exchanger. However, this introduces a considerable dust collection problem. Besides, from a standpoint of capacity, it is inefficient as well as from a heat-cost standpoint. This makes it unduly expensive. Therefore, a type of indirect-heat rotary dryer is indicated which would greatly reduce both the dust problem and the heat cost.

Q. *What is meant by an indirect-heat rotary dryer?*

A. One in which the material to be dried is warmed by contact with the heated metal surfaces, which in turn are heated by the medium used (usually furnace gases or steam). Those using furnace gases are called "indirect fire dryers". Atmospheric and vacuum drum dryers are examples of steam-heated indirect dryers, but the type in greatest use is the steam tube dryer. This is often referred to as the "Louisville Type" because of the thousands of Louisville Steam Tube Dryers built during the past 55 years.

Q. *How does an indirect-heat dryer minimize the dust problem?*

A. In an indirect-heat dryer, only enough air is admitted to carry off the evaporated moisture. Thus, the air has nothing to do with the heating of the material. Generally, this low air velocity results in insignificant dust loss.

Q. *How does this differ from the operation of a direct-heat dryer?*

A. In direct-heat dryers, the hot air furnishes the heat for drying besides removing the evaporated moisture. The amount needed to supply the necessary heat results in a sufficiently high velocity through the dryer to carry out an excessive amount of fine material particles.

Q. *It seems I need an indirect-heat dryer. How can I get competent advice and more information regarding my particular requirements?*

A. The Louisville Dryer engineering staff will be glad to analyze your requirements, arrange for necessary pilot plant tests, and submit an unbiased recommendation accompanied by estimated costs. You incur no obligation by using this service.

PROCESS EQUIPMENT DIVISION GENERAL AMERICAN TRADE MARK

LOUISVILLE DRYING MACHINERY UNIT

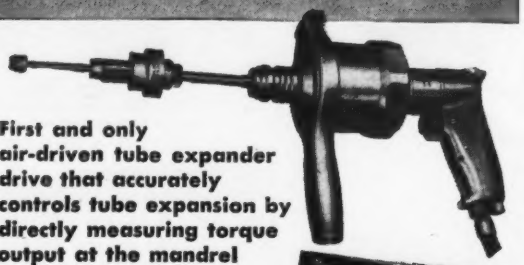
GENERAL AMERICAN TRANSPORTATION CORPORATION

Dryer General Sales Office: 139 So. Fourth Street, Louisville 2, Kentucky
Eastern Sales Office: 380 Madison Avenue, New York 17, New York
In Canada: Canadian Locomotive Company, Ltd., Kingston, Ontario, Canada
General Offices: 135 S. La Salle Street, Chicago 90, Illinois

When inquiring check 4874 opposite last page

For Expanding
Heat Exchanger Tubes

NEW
WILSON
Torq-Air-Matic



First and only air-driven tube expander drive that accurately controls tube expansion by directly measuring torque output at the mandrel

Only the Wilson Torq-Air-Matic offers all these features: air driven, automatic trip-off, completely integrated, non-electrical, non-frictional, calibrated in ft lbs torque, lightweight, simply adjusted.

Send for your copy of Wilson Bulletin 55.

Wilson Heavy-Duty Air Driven Cleaners

offer quick way to clean fouled heat exchanger tubes

Wilson Tube Cutter

easy to use, does fast job, a fine, reasonably priced tool

Representatives in principal cities
Thomas C. Wilson, Inc. • 21-11 44th Ave., Long Island City 1, N. Y.
Cable address: "Tubeclean", New York

WILSON
TW-868
TUBE CLEANERS • TUBE EXPANDERS

When inquiring check 4875 opposite last page

NEW LITERATURE

Figuring freight rates

Two slide computers for determining motor-freight rates between cities are available to shippers in midwest area. One is designed for use from Chicago and Milwaukee to northwestern destinations; the other from the Twin Cities and Duluth to eastern and southeastern destinations. Freight-rate computers — Mueller Transportation Company, Dept. CP, 2523 Wabash Avenue, St. Paul 14, Minn. Check 4876.

Machining of Teflon

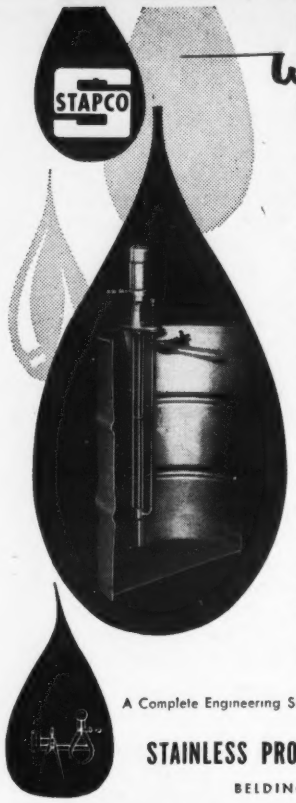
Solution to problems in close-tolerance machining of Teflon is subject of four-page report. Development of special extrusion equipment, adaptation of machine tools, establishment of controls, and training of machinists are some of points covered. "Precision Machining of Teflon" — Tri-Point Plastics, Inc., Dept. CP, 175-177 I.U. Willets Rd., Albertson, L.I., N.Y. Check 4877.

Boron polymer research

Report of 36 pages deals primarily with synthesis of alkyl and aryl boron dichlorides used as intermediates for synthesis of boron-substituted borazones and of tri-β-n-butylborazole. Study of analysis of organo-boron compounds is also included. To obtain "Research on Boron Polymers part 4," PB 121718, remit $1.00 direct to Office of Technical Services, United States Dept. of Commerce, Washington 25, D.C.

Heat exchanger data

Design and construction of finned-tube heat exchangers are described in 12-page bulletin. Applications of equipment to generator cooling, air and gas cooling, or heating services in chemical process plants are illustrated and explained. Bul 1200 — The Griscom-Russell Company, Dept. CP, Massillon, Ohio. Check 4878.



IF IT WILL FLOW
Will-Flow
WILL PUMP IT!

Adhesives, inks, chemicals, foods and drugs of semi-solid or heavy liquid consistency are just a few materials efficiently transferred from one point to another through lines by Will-Flow Systems.

Pumped directly from drum-sized containers, materials are fully protected from contamination by Will-Flow. All parts in contact with the product are constructed of 18-8 stainless steel or similar materials. Models available to handle various capacities.

Will-Flow is fully automatic in operation and delivers materials to points of use at uniform pressures without spillage, wastage, or loss through evaporation. Improves plant housekeeping conditions and lowers material handling costs.

If it will flow, Will-Flow will pump it! Write for full information.

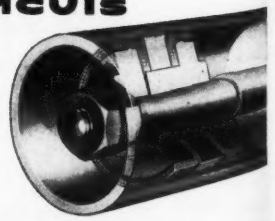
A Complete Engineering Service

STAINLESS PRODUCTS CORPORATION
BELDING, MICHIGAN

When inquiring check 4879 opposite last page

KEEP EFFICIENCY HIGH
with DARCOVA
PUMCUPS

Pumcup designs include the conventional and 45° bevel types in a full range of sizes for all reciprocating pump and cylinder mechanism requirements.



A LOT of dollars go slipping right past the pistons of reciprocating pumps and cylinders that must be frequently repacked. But Darcova Pumcups keep pump efficiency *up*, hold slippage and maintenance *down!*

Because of Darcova's unique design, true texture engineering and precision manufacture, Pumcups outlast other packing at least 3 to 1.

Why not judge for yourself? Get all the facts. Send today for informative Bulletin No. 5503.

DARLING VALVE & MANUFACTURING CO.
Williamsport 4, Pa.

DARCOVA
THE ORIGINAL COMPOSITION CUP
TRADE MARK
PUMCUPS

When inquiring check 4880 opposite last page

Silicone-modified rubbers

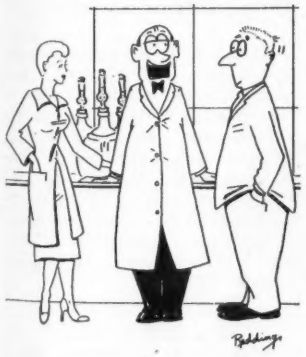
Qualities, properties given to conventional rubbers by silicones are defined in 32-page bulletin. "HiSil Bul 12" — Columbia-Southern Chemical Corp., Sub. of Pittsburgh Plate Glass Co., Dept. CP, One Gateway Center, Pittsburgh 22, Pa. Check 4881.

Describes switches

Bulletin of four pages illustrates and describes small precision switches for electronic control requirements. Switch bul — Micro Switch, Div. of Minneapolis-Honeywell Regulator Co., Dept. CP, Freeport, Ill. Check 4882.

Lists rare earth oxides

Purified rare earths, as well as scandium and yttrium oxides, are listed in two-page price list. Also included are chlorides, nitrates, fluorides, sulfates, and acetates. Rare earth oxides price list — Research Chemicals Inc., Dept. CP, PO Box 431, Burbank, California. Check 4883.



"We consider Miss Jones here as one of the 'fringe benefits' of the company."

Dreamed up by James V. Redding, The Central Pharmacal Company, Seymour, Indiana

They look like twins... but one is synchronous

Louis Allis "SYNCRO-*SPEDE*"* offers... for the first time... a synchronous motor in the same frame sizes as a standard induction motor

New from Louis Allis — *the most compact and efficient synchronous induction motor on the market* ... the revolutionary "Syncro-Spede." It's the *only* synchronous motor built in standard NEMA frames for comparable ratings in any enclosure.

The space-saving "Syncro-Spede" has no external excitation, wound rotating fields, collector rings or brushes—offers simplified control and low-cost operation. And it's virtually maintenance-free.

In performance, "Syncro-Spede" delivers and maintains exact synchronous speed within its rated capacity, regardless of load variations or voltage dips. When "Syncro-Spede" motors of several different ratings are powered by a single adjustable-frequency source, their acceleration, running speed, and deceleration can be synchronized.

"Syncro-Spede" is the low-cost answer to such demanding synchronous applications as *precise adjustable-frequency multi-motor systems*... high-frequency generator drives and constant-speed conveyor drives . . . precision timing and metering devices . . . recording instrument drives . . . any system requiring constant speeds from no-load to full-load.

"Syncro-Spede" sizes range up to 100 hp. For information and expert application engineering assistance, contact your nearby Louis Allis District Office or write directly to The Louis Allis Company, 448 East Stewart Street, Milwaukee 1, Wisconsin.

*"Syncro-Spede" is a trademark of the Louis Allis Co.

LOUIS ALLIS

MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE SPEED DRIVES

When inquiring check 4884 opposite last page

COOLING TOWER POWER
is most efficiently utilized by
Marley
Multi-Blade Aerfoil Fans

Marley fans are unexcelled for the job of converting applied power to actual cooling performance, but the qualities that make them positively distinctive are ultra-smooth operation and long-life durability. It requires just two words—MULTI-BLADE and AERFOIL—to point out the characteristics that produce these stand-out advantages.

Watch a 22-foot, 12-blade Marley fan operate; listen to it operate. The customary "huff and puff" pulsation of large fans is not there. There is no structure-shaking vibration. The result? Longer life for speed reducer, drive shaft, fan cylinder and structure. That is the multi-blade advantage.

The Marley fan is inherently rugged and durable. Each blade is a single casting, a rigid, homogenous unit of specially selected aluminum alloy that retains its aerfoil shape permanently. Marley fans never develop tip-sag or service flutter. The design completely eliminates weld and rivet failures, skin cracks, imperfect laminations and internal corrosion.

All machine operations on Marley blades and hubs are carefully quality controlled. Blade surfaces are protected by a double-coated baked plastic finish. Each fan is balanced at the factory and match-marked for field assembly.

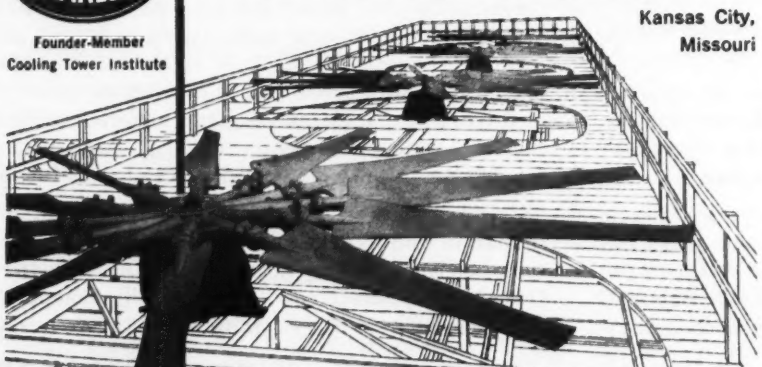
Owners of towers of all types and makes are modernizing their equipment by changing to Marley Multi-Blade Aerfoil Fans—often after side-by-side comparative test with present equipment. Write for Bulletin FH356 and get the complete story of modern design applied to cooling tower fans.

MARLEY

Founder-Member
Cooling Tower Institute

The Marley Company

Kansas City, Missouri



When inquiring check 4885 opposite last page

NEW LITERATURE

Bactericide, fungicide

Four-page brochure covers SOCCI #6618, a non-ionic combination bactericide and fungicide for use with binders in sanitizing textiles. Also included is brief description of #6618-C, a cationic form, for semi-durable germicidal finish without use of binders. SOCCI #6618 — Scientific Oil Compounding Co., Inc., Dept. CP, 1637 S. Kilbourn Ave., Chicago 23, Illinois. Check 4886.

Palletless handling

Bulletin of four pages on push-pull loader attachment with integral sideshift describes proper procedure for handling without pallets. Specifications on attachment, which can be fitted to any of manufacturer's industrial lift trucks, are included. Bul 2117 — The Yale & Towne Mfg. Co., Dept. CP, 11,000 Roosevelt Blvd., Philadelphia 15, Pa. Check 4887.

H_3PO_4 evaporator

Operation, design, details of construction, and other data on manufacturer's phosphoric acid evaporator are contained in eight-page bulletin. Charts detail viscosity, density, and temperature of various phosphoric acid solutions used to determine individually designed evaporator installations. Bul SW-202 — Swenson Evaporator Co., Div. of Whiting Corp., Dept. CP, Harvey, Ill. Check 4888.

Ammonium thiocyanate as corrosion inhibitor

Condensed report summarizes evaluation, under simulated field conditions, of the effectiveness of ammonium thiocyanate as corrosion inhibitor for ammoniating liquors. Possible uses in other fields may be suggested from the material contained in this eight-page report. Bul 102 — J. T. Baker Chemical Company, Dept. CP, Phillipsburg, N.J. Check 4889.

Frames and clamps

Bulletin of four pages describes and illustrates manufacturer's apparatus support frames and clamps. Frame and clamp bul — The Emil Greiner Co., Dept. CP, 20-26 N. Moore St., New York 13, N.Y. Check 4890.

AMA consultant list

Thorough, systematic listing of 427 consulting organizations who are AMA members has been published. The list, in alphabetical order and by field of consultancy, is accompanied by brief description of each firm's specialty. To obtain "Directory of Consultant Members" remit $2.00 ($1.00 for members) direct to American Management Association, 1515 Broadway, Times Square, New York 36, N.Y.

Rauwolfia bibliography

Twenty-page, digest-size bibliography lists 223 literature references to rauwolfia and its alkaloids. Sup. #1 — S. B. Penick & Co., Dept. CP, 50 Church St., New York 8, N.Y. Check 4892.

Shows tractor-shovels

Catalog of eight pages pictures operating, performance, and maintenance advantages of two models of tractor-shovels. Information on engineering, design, and construction features is included. Bul MS-1102 — Construction Machinery Division, Allis-Chalmers Manufacturing Company, Dept. CP, Milwaukee, Wisconsin. Check 4893.

Describes new alkyds

Detailed specs and descriptions of isophthalic acid alkyds are included in 16 page brochure. "RCI Super-Beckosols" — Reichhold Chemicals, Inc., Dept. CP, White Plains, N.Y. Check 4894.

HOW TO PICK A COLLOID MILL

QV-6-1 Laboratory Model has ½ HP universal motor with 5 gal. stainless steel jacketed hopper or pressure head for direct feed.

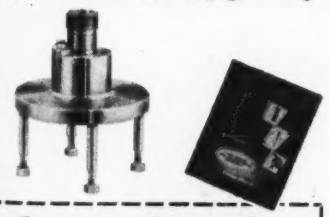
VT-11 Production Model has 15 or 20 HP motor with 20 gal. stainless steel jacketed hopper.

Picking the proper colloid mill—for the best possible results in grinding, emulsifying and homogenizing—isn't always easy. For most colloid mills are "look-alikes"—on the *outside*.

But if you stripped a *G-W Eppenbach Colloid Mill* down, you'd see fundamental differences—like the calibrated micrometer adjustment that assures accurate clearances between rotor and stator (which can be reproduced *exactly* at any time) ... the by-pass assembly that recirculates material until ready for discharge ... the *tangential* discharge outlet that allows material to flow out rapidly at a natural angle, for maximum production ... the safety stop studs for protection of the rotor-stator at small gap settings ... the component design of rotor-stator ... and many other quality features.

In addition, any laboratory, pilot plant, or production model with the standard, open, gravity fed hopper can easily be transferred into a unit suitable for continuous flow operations by interchanging the hopper with the pressure head assembly shown below.

All these features make the easy-to-use, easy-to-clean, easy-to-install Eppenbach Colloid Mill an exceptional long-term investment in service, economy and efficiency. Write for our new 24-page catalog.



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Name and Title_____
Company_____
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When inquiring check 4895 opposite last page

Mobile mixer-muller

Specifications, applications, and features of 3-cu ft capacity mobile mixer-muller are outlined in four-page bulletin. Photographs and drawings illustrate unit which manufacturer recommends for small production, pilot plant, and laboratory use. Muller Bulletin — Simpson Mix-Muller Div., National Engineering Co., Dept. CP, Machinery Hall Bldg., Chicago 6, Ill. Check 4896.

Facts on purifying tallow

Purifying tallow and inedible fats, protecting them against deterioration, chlorine dioxide bleaching by dry gas and wet methods, and procedure and apparatus for determining effectiveness of chlorine dioxide as a bleach are discussed in 12-page booklet. "Upgrading Inedible Fats with Chlorine Dioxide" — Olin Mathieson Chemical Corp., Dept. CP, 460 Park Ave., New York 22, N.Y. Check 4897.

Methods for analysis— aluminum chloride

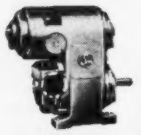
Manufacturer's methods for analysis of aluminum chloride are described in detail in 24-page research report. Along with discussion of methods of analysis, report covers precautions and handling, reagents, indicators, and standard solutions required. Research Report 11.57 — Solvay Process Div., Allied Chemical & Dye Corp., Dept. CP, Syracuse 1, N.Y. Check 4898.

Lift truck operations

Role of manufacturer's electric lift trucks in variety of industrial material handling applications is explained and illustrated in 16-page bulletin. Features are pointed out and capacities listed. Various attachments are shown and described. "Lever", Spring 1957, — Lewis-Shepard Products, Inc., Dept. CP, 125 Walnut St., Watertown 72, Mass. Check 4899.

...STERLING ELECTRIC POWER DRIVES

Machinery manufacturers and users in virtually every industry report outstanding performance achievements with Sterling Electric Power Drives ... achievements in greater productivity, in greater machine versatility, in lower maintenance cost, in rugged dependability...achievements that give dollars and cents proof that Sterling Electric Power Drives can make the *big* difference between average and optimum productivity of your machinery and equipment.


STERLING SPEED-TROL VARIABLE SPEED MOTORS

STERLING SLO-SPEED GEAR MOTORS

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STERLING MULTI-MOUNT SPEED REDUCERS

Write today for Bulletin No. 185. Discover the big advantages Sterling Electric Power Drives can bring to your plant.

Sterling offers a wide range of Electric Power Drives of advanced design—variable or constant speed—with manual or automatic controls.

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Safe—Rigid
Tri-Forged
GRATING
Forge welding double triangular-shaped cross bars to the bearing bars adds rigidity and safety to Dravo 1-W-4 Tri-Forged Grating.
Solid one-piece construction. Standard opening between bearing bars is 1". Cross bars are 4" center to center. Safe, smooth weld eliminates dirt-catching corners.
For information, write Dravo Corporation, Dept. D-2707, Pittsburgh 22, Pa.
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—Custom engineered to meet your specific requirements. Exact capacity . . . uniform product purity and stability.
—Ruggedly built to provide many years of trouble-free service. Minimum wear. Low maintenance.
—Adaptable for conversion to any type of filtration operation should changes in your product or process ever become necessary.
Sperry Filter Presses are available in a wide variety of materials and capacities. Write today for the complete catalog.

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When inquiring check 4902 opposite last page

NEW LITERATURE

Noise control info

Informative literature on tests conducted on noise control protective equipment, covers ear muffs, ear plugs, and ear valves. "Noise Control Personal Protective Equipment" — Sigma Engineering Co., Dept. CP, Los Angeles 28, Calif. Check 4903.

'Light' truck crane handles 45 tons

Condensed truck chassis and truck crane specifications for 45 ton capacity unit are presented in two-page bulletin. Series of tables lists truck crane lifting capacities for unit with a total weight of 90,000 lb. Bul K516 — Koehring Company, Dept. CP, Milwaukee 16, Wis. Check 4904.

Company's chem index

Short descriptions of all their chemicals are in eight-page, 1957 chemical index. Chemicals are listed alphabetically and according to classes. Information on eight new compounds of pyridine type is included. Chemical Index — Reilly Tar & Chemical Corp., Dept. CP, Merchants Bank Bldg., Indianapolis 4, Ind. Check 4905.

Acrolein dimer

Eight-page bulletin on acrolein dimer has been released by Union Carbide Chemicals Co., Div. at Union Carbide Corp., Dept. CP, 30 E. 42nd St., New York 17, New York. Check 4906.

Spectrochemical analysis excitation sources

Second in series of spectrochemical analysis handbooks, 24-page bulletin describes design and applications of variety of excitation source units and discharge stands. Bul CH402 — Jarrell-Ash Company, Dept. CP, 26 Farwell St., Newtonville 60, Mass. Check 4907.

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make the "two-way" test
Make sure that you get the highest quality laboratory glassware for the lowest possible price by making the "TWO-WAY" Test.
TO MAKE THE "TWO-WAY" TEST!
STEP 1. Obtain samples of several advertised brands of laboratory glassware. Be sure to include a piece of Doerr Diamond D Blue Line. Devise the most rigid tests you can think of and evaluate each brand on the basis of these tests. Tabulate the results.
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Ask your dealer about the Diamond D Blue Line or send for more detailed information today.
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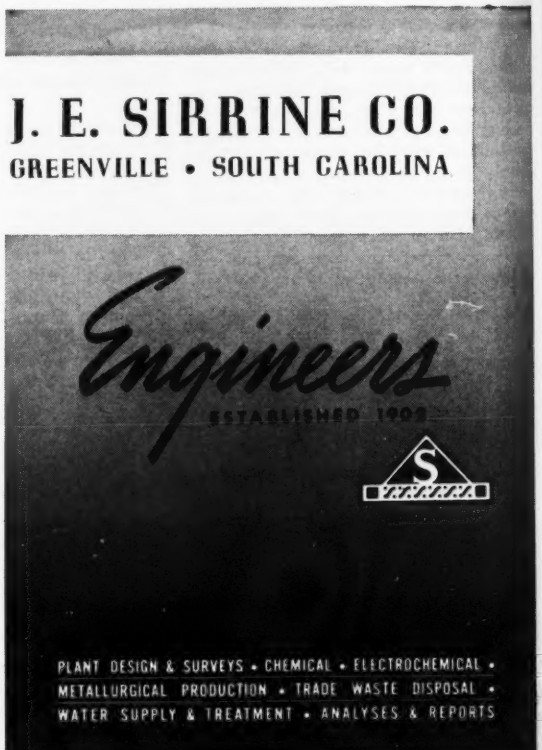
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NEW LITERATURE

Hexachlorophene — USP

Eight-page supplementary bibliography on hexachlorophene USP abstracts 28 articles and one patent. A subject index is given. Supplementary bibliography — Sindar Corp., Dept. CP, 330 West 42nd St., New York 36, New York. Check 4910

Story of explosive valves

Bulletin of eight pages tells story of evolution of manufacturer's explosive actuated valves for industrial applications. Many variations of valves are illustrated and described. "Explosive Actuated Valves" — Conax Corporation, Dept. CP, 2300 Walden Ave., Buffalo 25, New York. Check 4911.

Pallet roller features

Design and construction features of manufacturer's pallet rollers, with full pressure lubrication to all bearings, are shown and described in one-page bulletin. Pallet roller bul — Frank L. Robinson Company, Dept. CP, Latham Square Building, Oakland 12, Calif. Check 4912.

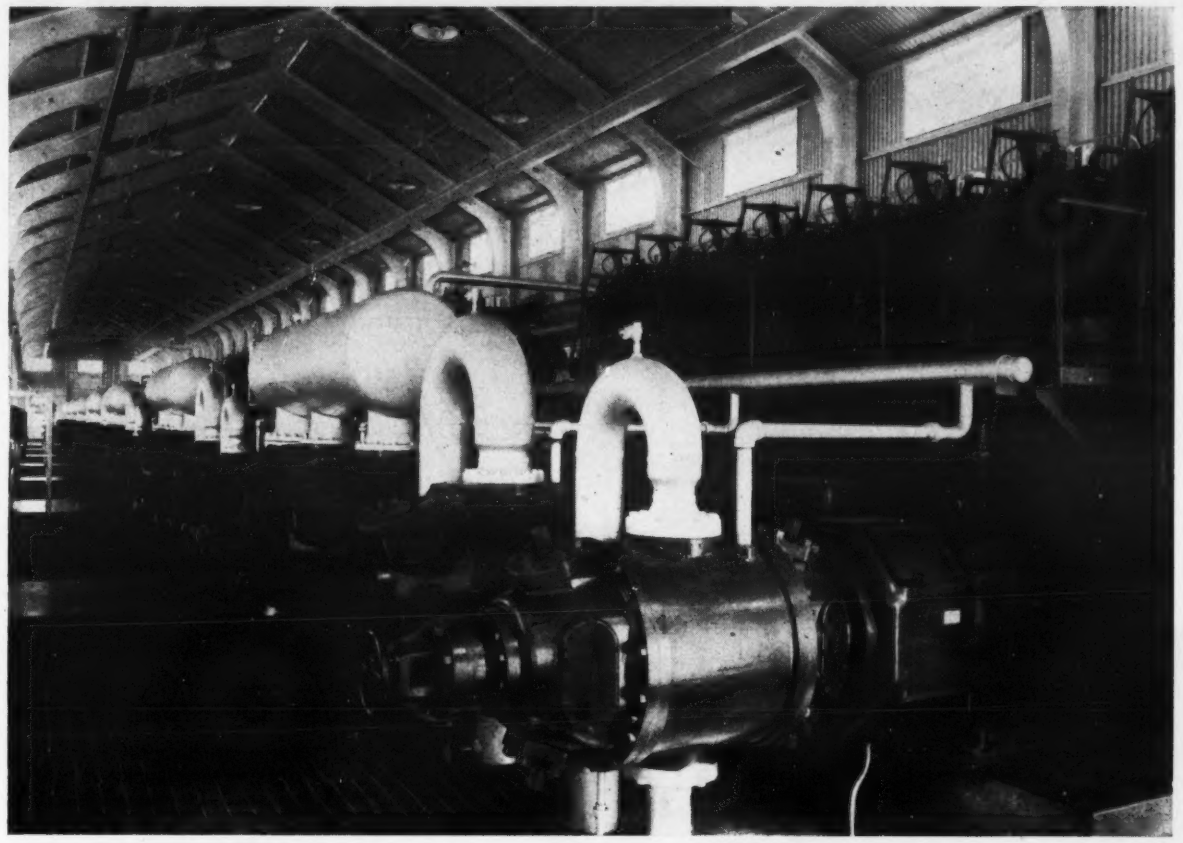
Adhesive data—plastics

Folder of four pages describes adhesives for bonding plastics to plastics, or plastics to non-plastics. It covers properties, uses, and application of seven cements. "Adhesives for Plastics" — Schwartz Chemical Co., Inc., Dept. CP, 326 W. 70th St., New York 23, New York. Check 4913.

Psychrometric chart in bulletin on dryer

Information on use of multi-louvre dryers for drying, cooling, and processing of bulk materials is contained in 16-page bulletin. Two-page psychrometric chart is featured. Book 2609 — Link-Belt Co., Dept. CP, Prudential Plaza, Chicago 1, Ill. Check 4914.

Look to COOK for Better Rings!

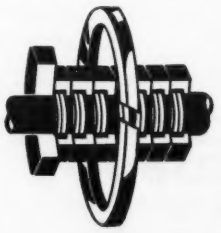


Cook packing and rings help keep compressors humming!

A well-known oil-producing company keeps this big lineup of Clark Bros. compressors running night and day in a West Texas gasoline plant. Keeps them running smoothly and efficiently, too — *thanks in good measure to C. Lee Cook packing and piston rings!*

Whatever type industrial equipment you operate, if it uses piston rings and packing, chances are good that it was Cook-equipped *when it was built.* That's why your best bet for continued trouble-free performance is to *keep it Cook-equipped.*

Your nearby C. Lee Cook representative will be glad to give you all the facts about precision-engineered Cook products. Why not talk with him soon? C. Lee Cook Company, 932 South 8th Street, Louisville 3, Kentucky.



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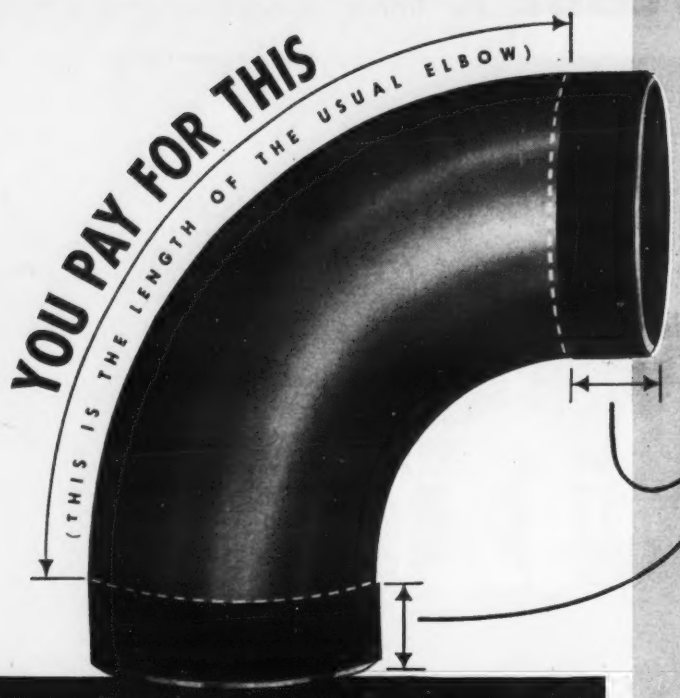

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"LONG TANGENT"
ELBOW

21% to 42% MORE ELBOW
AT NO EXTRA COST

It's a built-in bonus that comes right with the elbow . . . a tangent or straight section at each end of the fitting.* Benefits of this bonus . . . this extra value . . . are yours AT NO EXTRA COST because Midwest "Long Tangent" Elbows are PRICED THE SAME AS OTHER ELBOWS. It's a value you can't afford to miss.

For additional information, ask your Midwest distributor or write us for Catalog 54.

*Size 24" and smaller have tangents equal to ¼ nominal pipe size; for example, 12" ell has 3" straight ends. Above 24" pipe size, all tangents are 6" long.

ADVANTAGES OF MIDWEST "LONG TANGENT" ELBOWS

- They save pipe.
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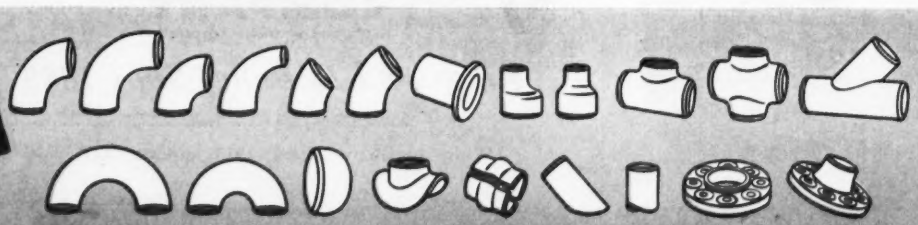


For more information on product at left, specify 4916 see information request blank opposite last page.

Standard Oil Case

Starts on page 24

pricing systems or even with all the seller's discriminatory prices to buyers. It speaks only of the seller's 'lower' price and of that only to the extent that it is made 'in good faith to meet an equally low price of a competitor.' The Act thus places emphasis on individual competitive situations, rather than upon a general system of competition." And the Standard Oil Case made clear that the burden of showing good faith — that is, proof that the seller as a reasonable and prudent man believed that he was in fact meeting a competitor's lower price — was on the seller, and not on the Federal Trade Commission.

The real purpose of antitrust laws — free, vigorous competition

Second, the Standard Oil Case seems consonant with the Nation's antitrust policy. A seller's right to meet a competitor's prices by granting price differentials to some customers without reducing his prices to all must remain an essential qualification to any law meant to discourage price discrimination. *For a seller constrained by law to reduce prices to some only at the cost of reducing prices to all may well end by reducing them to none.* As the Federal Trade Commission in 1953 recommended to Congress, "the right to meet the lower price which a competitor is offering to a customer, when this is done in good faith, is the essence of competition and must be permitted in a free competitive economy."

Anything less, I think, would move the price discrimination statute into irreconcilable conflict with the Sherman Act. As the late Mr. Justice Jackson, a former Attorney General and a former head of the Antitrust Division, observed during the oral argument of that case:

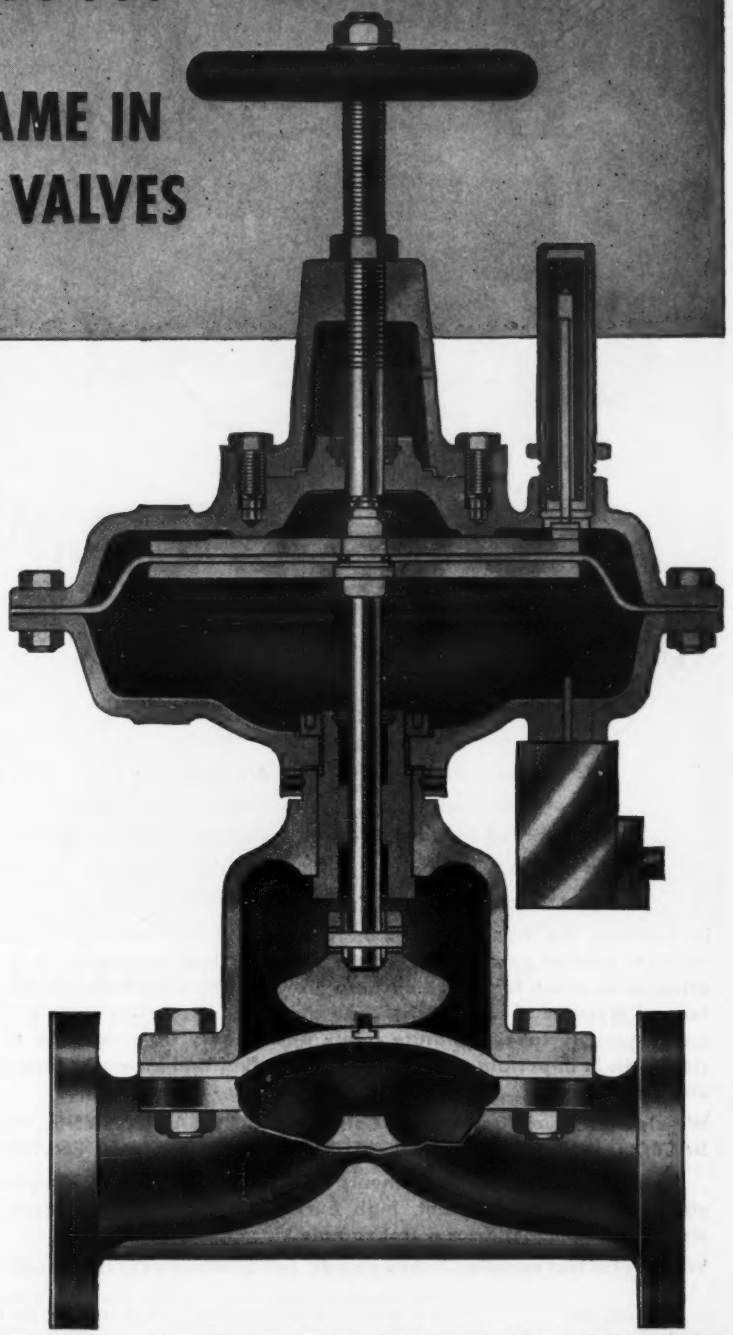
"The whole philosophy of the Sherman Act is go out and compete, get business, fight for it. Now the whole philosophy

Turn to next page

CONOFLOW...

THE FIRST NAME IN AIR OPERATED SAUNDERS VALVES

THOUSANDS IN USE IN LEADING COMPANIES



When you specify Conoflow Air Operated Saunders Valves your confidence is affirmed by thousands of successful installations. Many Conoflow Saunders Valves have been in constant, 24-hour-a-day service, year in, year out, requiring little or no maintenance.

When you specify Conoflow Close-Coupled Saunders Valves you know that you are getting the benefit of more years of experience in this line than any other valve manufacturer can offer. This *extra* engineering "know-how" enables Conoflow to provide:

- Valves in *all sizes* for both *on-off* and *throttling* control—with many original and time-proved optional features.
- Wholly integrated design—*complete valve assembly* made at the Conoflow factory by experienced men.
- Highest quality construction materials —the *right* material for the *right* job.
- Positive performance—every unit *completely tested* for dripless shut-off and peak operating efficiency before shipment.

When you specify Conoflow Saunders Valves you are certain that you are getting the *best* Saunders valve available . . . and at a *competitive price.*

WRITE FOR NEW BULLETIN HB-6 DESCRIBING THE COMPLETE LINE OF CONOFLOW SAUNDERS VALVES. IT WILL BE MAILED PROMPTLY.

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FOREMOST IN FINAL CONTROL ELEMENTS

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For good chemical resistance—

Use NFM NYLON Filter Cloth

NFM Nylon Filter Cloth is not affected by

Most common alkalies	Alcohols
Most organic acids	Carbon Bisulphide
Halogenated hydrocarbons	Carbon Tetrachloride
Aldehydes	Trichloroethylene
Ketones	Benzene

In addition, the fiber strength of Nylon ranks first among all others, whether natural or synthetic. It has excellent heat resistance. It is unaffected by mold, fungi and bacteria growths. The extremely smooth surface of Nylon makes for easy cake discharge — even extremely sticky and tenacious cakes separate freely and cleanly from the face of the cloth. This is important since it reduces blinding and increases flow rates and filter capacity.

We also weave cloth of treated Cotton, VINCEL†, SARAN, DYNEL, GLASS, DACRON††, TEFLON*, POLYETHYLENE, ORLON*, and POLYMAX†.**

...for your Filter Paper requirements try NETONE Filter Paper. High tensile strength, chemical resistant, high burst factor, abrasion resistant and crease resistant. Send for a test sample.

Write us for test samples—when you do, tell us about your filter problems.

*TM for duPont Acrylic Fiber †TM—NFM Reg. U. S. Pat. Off.
***TM for duPont Tetrafluorethylene Fiber ††TM for duPont Polyester Fiber

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Standard Oil Case

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is that you really must not; you should let this business go and not meet the competition. I have difficulty in knowing where we are with this."

Thus, the Standard Oil Case goes far to harmonize the Robinson-Patman Act with the basic tenor of antitrust policy. As one witness before your Committee recently explained the ["good faith"] defense:

"It is purely a defensive procedure to retain the business that we have on our books.

"It has also been our experience that where such a situation does take place and we or others meet a competitor's lower price, and . . . there might be some disadvantage to other buyers who do not have that price, . . . somehow a very temporary situation exists, and if the forces of free and open competition . . . are allowed to operate, . . . the situation gets straightened out, and . . . *this disadvantage soon disappears.*"

To clear up the Standard Oil Case

Finally, it may be helpful to clear up possible misunderstandings about the effect of the Standard of Indiana case. A good beginning point is the testimony of numerous small gasoline dealers. They spoke of gasoline price wars throughout the country and the effect of these wars on small independent gas dealers. According to their testimony, some of these price wars were initiated by the major oil companies in order to obtain a larger share of the market. They said that an oil company would grant lower prices provided its dealers would meet the cut prices of dealers of other oil companies. The dealers testified that the major oil companies would claim the "good faith" defense as a justification for their granting these lower prices to dealers who would agree to cut their prices, while at the same time not granting such lower prices to other dealers.

Initially, an agreement to grant a price cut to a dealer who, in turn, would cut his price to a specified level, we believe, violates the Sherman Act. We have indicted oil companies for that very thing.

Beyond the Sherman Act, neither the findings in the Standard of Indiana Case nor the present "good faith" clause condones such conduct under Robinson-Patman.

The Standard Oil Case has not, as its critics predicted, adversely affected enforcement of the "good faith" clause. Since Standard, the "good faith" meeting-competition defense has been raised in twenty-eight contested cases. In six of these, cease and desist orders have been issued. In each of these six cases the defense was rejected. In two other cases, respondent raised the defense in his answer, later elected not to contest the charges, and a consent order to cease and desist was entered. In another case, the hearing examiner dismissed the count for complete failure of proof. In six other cases, complaints were dismissed on the ground that there was no showing of substantial injury to competition. There are thirteen formal cases now pending within or before the Commission in which the good faith defense is involved. In two more cases, complaints have been issued, but answers have not been filed. The Standard Oil Case itself is, of course, still pending in the courts.

In sum, then, the Standard of Indiana case merely restated what most people thought the law already was. Thus, as early as 1941, the staff of the Federal Trade Commission wrote:

"The amended (Robinson-Patman) act now safeguards the right of a seller to discriminate in price in 'good faith' to meet an equally low price of a competitor, but he has the burden of proof on that question. This right is guaranteed by statute and could not be curtailed by any mandate or order of the Commission. *The right of self-defense against competitive price attacks is as vital in a competitive economy as the right of self-defense against*

personal attack."

And the Department of Justice wrote the Chairman of the House Committee on July 10, 1951, that . . .

". . . the Department has always interpreted the 'good faith' clause as permitting a seller to defend conclusively against a charge of price discrimination by affirmatively showing that such discrimination was made in good faith to meet the equally low price of a competitor (Rept. No. 2438, 82d Cong., p. 6)."

Against this background, I urge that Standard of Indiana's holding (that proof of "good faith" meeting of a competitor's lawful price constitutes an absolute defense) should stand. And, hence, S. 11, I believe, should not be enacted. ■

Price Discrimination

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of evidence in each case, raising a question of fact as to whether the competition justified the discrimination."

Despite this encouraging development in 1945, the law with respect to meeting competition as a defense to price discrimination is now back where it was prior to the enactment of the Robinson-Patman Act. For in 1951 the Supreme Court held in the Standard Oil of Indiana case that the Federal Trade Commission was wrong in rejecting Standard's defense of meeting competition even where it had been shown that the discriminations had a substantially adverse competitive effect among distributors. Once again, then, meeting competition became an absolute defense to discriminations in price regardless of the magnitude of their anti-competitive effects among retailers and wholesalers. Moreover, the doctrine of the Standard of Indiana case seems to have been extended in subsequent decisions by lower Federal courts to the extent that it

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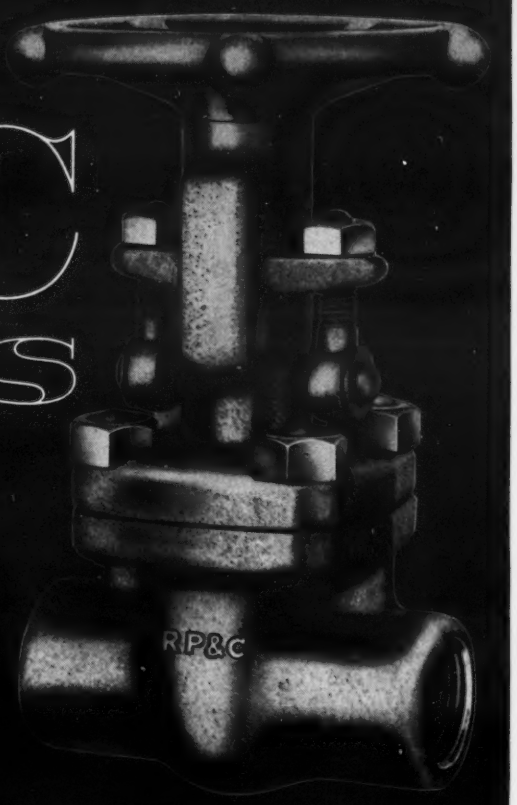

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Price Discrimination

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now appears likely that even the limitations indicated by the Supreme Court are of little if any substance.

As a result of these decisions, the Robinson-Patman Act has been seriously weakened. The public interest in protecting competition at all levels has been subordinated to the individual manufacturer's or seller's private interest.

The public interest again demands that something be done to repair the damage. Consequently, on January 7, 1957, I introduced in the Senate, on behalf of myself and several colleagues, the Equality of Opportunity Bill (S. 11). At about the same time Representative Wright Patman of Texas, co-author of the Robinson-Patman Act, introduced an identical bill (H. R. 11) in the House of Representatives.

Briefly, the bills would change the statute as interpreted by the Supreme Court by providing that meeting in "good faith" the equally low price of a competitor is *not* a defense to price discriminations which are proved to have the probable effect in any line of commerce of substantially lessening competition or tending to create a monopoly. Such meeting of a competitor's price would, however, continue to be an absolute defense to any price discrimination which was proved to have only the probable effect of injuring competition among competitors. The basic thought underlying the bills is that *price discriminations which substantially lessen competition or tend to create a monopoly are as detrimental to the public interest when accomplished in good faith as they are when done in bad faith.*

The bills restrict but do not eliminate the availability of the defense of meeting in "good faith" the equally low price of a competitor. Where it is shown that the discriminations may merely injure competition between individual competitors, the defense

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continues to be absolute. Where, however, it is shown that the discriminations are so serious that their effect in any line of commerce may be substantially to lessen competition or tend to create a monopoly, the defense is eliminated.

Hence, if S. 11 becomes law, a seller who finds it desirable to lower his price to one customer in order to meet in good faith the equally low price of a competitor may not have to lower his price to all competing customers or even to any of them in order to avoid an unlawful price discrimination. It is enough that he lower his price only to the extent necessary to prevent substantial lessening of competition or tendency to create a monopoly and not to the extent necessary to prevent injury to competition.

The significance of this difference is that, under the bill, such a seller would not be obliged to lower his price to a customer like the one who sought damages from his supplier in a recent case. In that case the court held that the small discrimination complained of could not have substantially lessened competition or tended to create a monopoly, as was alleged, but at most could only have injured competition between the complaining customers and his competitors, as was not alleged.

The bill (S. 11) should be especially welcomed by manufacturers who see a threat to themselves in the establishment and growth of large and powerful buyers. Without the bill, suppliers, under the guise of meeting competition, will continue to vie with each other to satisfy the voracious and insatiable demands of large buyers for preferential prices. This implies not only the sacrifice of the many small buyers but the supplier's dependence upon the few mass buyers.

Much has been said both by and on behalf of management about the difficulties of making decisions to comply with S. 11. I am confident that any such difficulties have been

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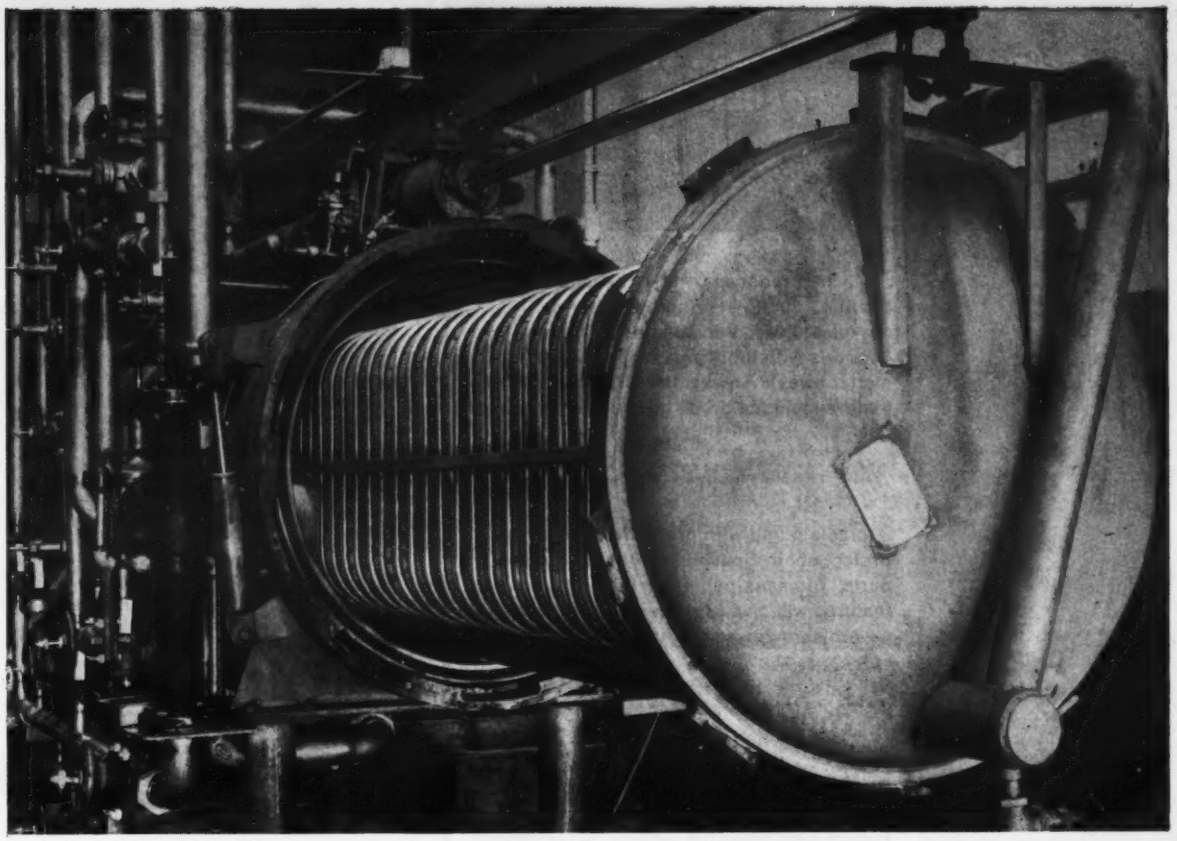

How Industrial Filter gets the profit out of fruit juice "Tank Bottoms"

The trouble with natural fluids is their variability—not only differences in batches but their tendency to stratify in storage. The latter was the problem in handling fruit juice at an eastern plant—the bottom layers in tanks were heavy with particles of valuable crystallized sugar that were lost in clarification. With their new Industrial filter system they extract the sugar at a handsome profit that paid for the system in a few months.

Industrial's Horizontal Filter clarifies juice and recovers sugar in one continuous operation. The filter is first pre-coated and clarification established. The juice is then flowing from the storage tank thru the filter and on to the processing lines. After the filter leaves have built up the maximum coating, the filter is blown dry and a mixture of water and air is injected under pressure. The water dissolves the fruit sugar and is continuously filtered out until the sugar content drops below 2% of soluble solids. The filter is then emptied, opened and the cake is recovered. Most Industrial Horizontal Filters have mechanical shakers that drop the cake directly into a truck for fast clean recovery of solids.

Industrial engineered filtration is not only cost saving... it's downright profitable! Besides the lucrative recovery of solids, this up-to-date unit operates at a high filtration rate, it requires only one man to run it, it eliminates the buying and washing of filter press cloths, and its all-around efficiency requires less filter aid.

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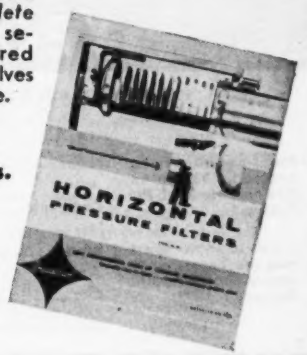

Write for Bulletin NH-122, a complete description of Industrial's Horizontal Filters.

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Spray gun delivers seamless coatings thick as sheet linings

Large metal cones for storage tanks are sprayed with Unichrome "Super 5300" Plastisol Coating for protection against corrosion and abrasion. Photo Courtesy General Coating Co., Woodbridge, N.J.

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Unichrome Plastisol Coatings demonstrate remarkable resistance not only to corrosion but also to abrasion. They withstand conditions that rapidly deteriorate unprotected metals or other materials. The coating has good flexibility to absorb mechanical abuse without harm. Should damage occur even years later, the coating can still be patched good as new. It sticks tight to primed metals – averaging a bond strength of 50 to 100 pounds per inch.

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Being a vinyl coating, a Unichrome Plastisol protects against acids, alkalies, and a host of other corrosives. The thick film blocks any permeation by solutions. So reliable is this protection, that over 1000 cleaning and metal finishing tanks in a single plant have not only been *lined* but also "lifetime" coated on their *exteriors* with Unichrome Plastisol.

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Price Discrimination

Starts on page 25

magnified by posing hypothetical situations which include imaginary horrors. True, S. 11 does not define with mathematical precision the white area in which meeting competition is a defense and the black area in which it is not—precision of that kind is not possible in a moderate approach. It can exist *only* where there is either complete prohibition or unrestrained permission.

Being moderate in its approach, S. 11 naturally contains a small gray area where the white meets the black. To businessmen who are heedless, if there are any, this gray area will present no problem — they will view it as white and assume unnecessary risks. To businessmen who are timid, if there are any, this gray area will likewise present no problem — they will see it as black and accept needless restrictions. To businessmen who are prudent, as if there are any who are not, the shaded area will also present no problem — in the light of the facts in each case they will see a line running through it which will be drawn by their willingness to resolve any doubt by what they know to be the public interest. Just as it is easy to distinguish between being stumbled over and being kicked, so it should not be difficult to differentiate a price discrimination which may economically maim the many small merchants from one which will clearly fall short of having that result. ■

Kefauver-Patman Case

Starts on page 26

— one another's prices, the larger marketer will enjoy the high-priced business where competition is weak or absent, and stand at least an equal chance of taking the low-priced business too. But more than that, when discriminations are

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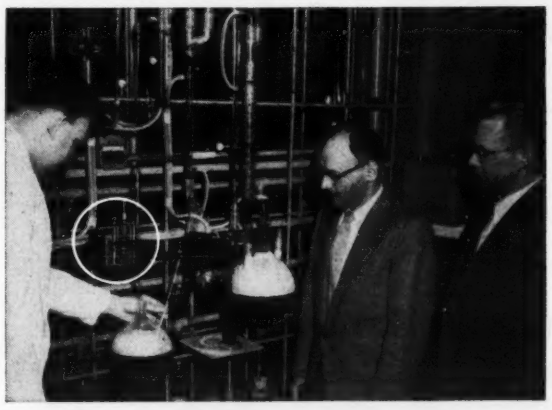

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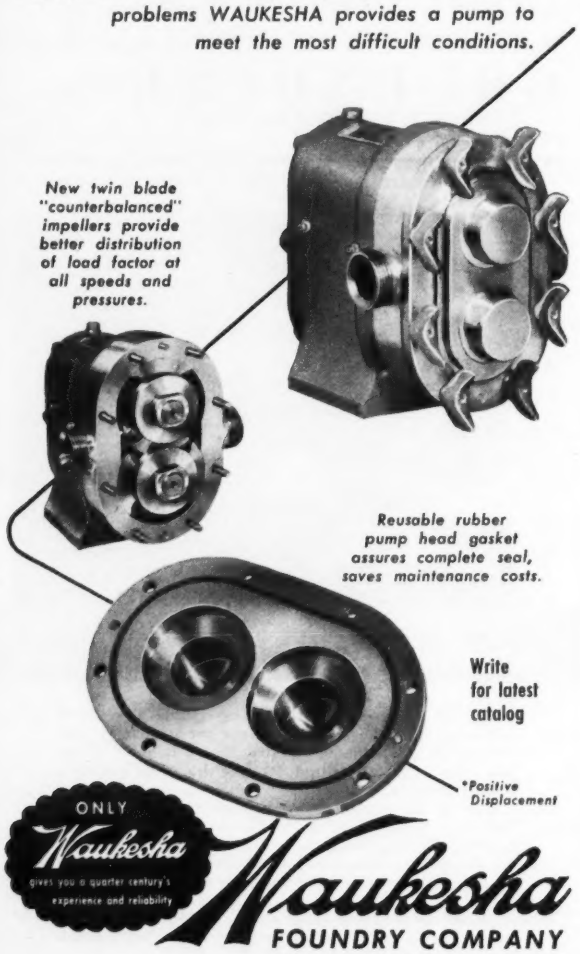
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Kefauver-Patman Case

Starts on page 26

the rule of the day, the bigger competitor usually receives an unearned advantage in the prices paid for supplies and raw materials; and this unearned advantage, too, enters into the competitive contest.

Big sellers vs. small sellers

In the first decades after the Sherman Act was passed in 1890, several antitrust suits were brought to break up certain monopolies that had been formed. Trying these suits in the public courts brought to light the part that discriminatory practices had played in creating these monopolies. It was as a result of such experiences as these that the Clayton Antitrust Act was passed in 1914. Section 2 of the Clayton Act was passed with high hopes that it would prevent discriminations of such magnitude and duration that would cause a "substantial lessening of competition or a tendency to create monopoly." The old Clayton Act contained a proviso, however, which proved to be a fatal loophole. The proviso was one that excused discriminations made in "good faith to meet competition." The purpose of the Robinson-Patman amendment to the Clayton Act, passed in 1936, was, more than anything else, to plug the "meeting competition" loophole.

Big buyers vs. small buyers

In the years just before the 1936 amendment was passed, extensive industry investigations were made by the Federal Trade Commission and by various committees of Congress. These investigations focused public attention on another aspect of discriminatory selling which had not been fully appreciated when the original Clayton Act was passed. These investigations revealed, in one industry after another, that wherever sellers were discriminating in prices, their big customers

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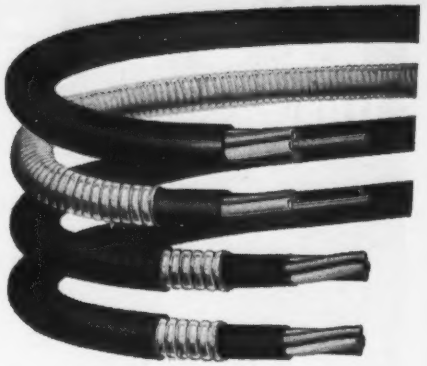

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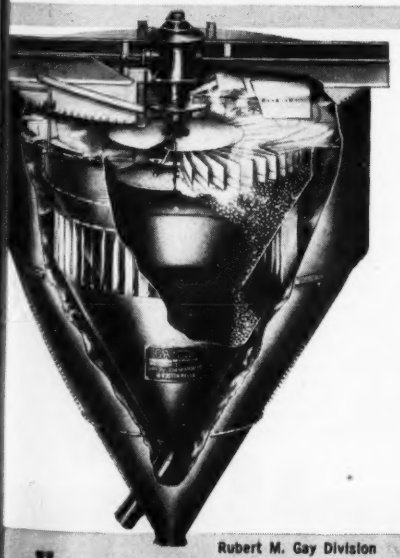

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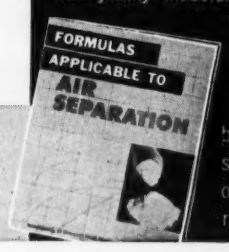

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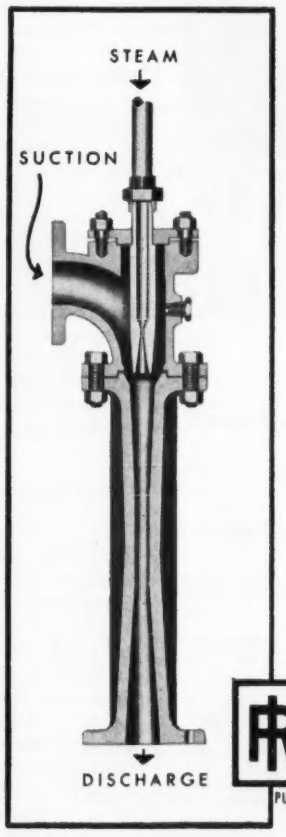

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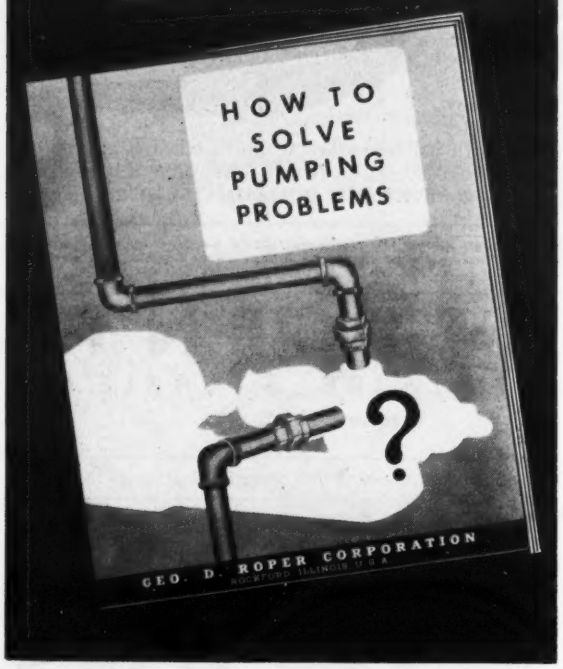

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Kefauver-Patman Case

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were receiving unearned advantages over the smaller competing customers. By "unearned advantages" we mean, of course, those which arise when the supplier makes discriminations between competing buyers which go beyond the supplier's cost differences in serving the different buyers. The law provides — as it should — an absolute exemption for price differences which are justified by the seller's cost differences.

The unearned advantages which the big buyers were receiving came about in several ways. In some instances powerful buyers were dealing with relatively weak suppliers, and were simply able to coerce discriminatory favors. In many instances, strong national suppliers were meeting prices offered the big buyers by small producers who had no large advertising budgets and no distribution systems of their own. As a practical matter, these small producers could hope to get business only by offering low prices. The national marketers, of course, preferred to take both the high-priced business and the low-priced business by discriminating, even though the long-run result would be to create monopoly buyers. It was here, then, that an additional reason for plugging the "meeting competition" loophole became clear. This loophole was effectively plugged — or so many of us in Congress thought at the time — by the passage of the 1936 amendment.

The loophole is reopened

In the Standard Oil (Indiana) case, the majority opinion of the Supreme Court interpreted the amended law in such a way as to put the "meeting competition" loophole back into the law. In brief, the Court ruled that a seller's discriminations are excused where these discriminations are made in "good faith to meet the lower price of a competitor," no matter

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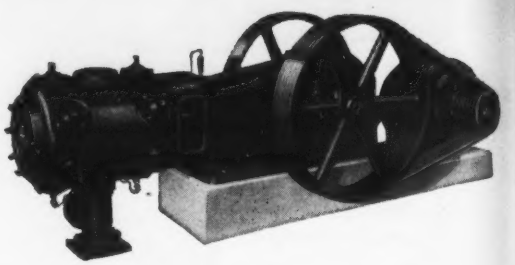
AIR COMPRESSORS



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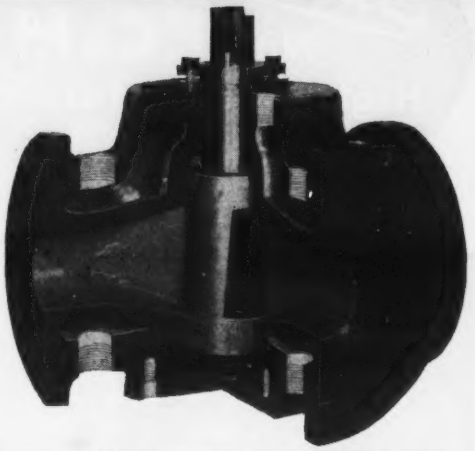
H&B ESTABLISHED 1887

Jacketed Spring Loaded PLUG VALVES

- 2-WAY OR STRAIGHT SPRING LOADED
- 3-WAY SPRING LOADED
- ANGLE SPRING LOADED
- AIR CYLINDER OPERATED SPRING LOADED—*all sizes and types*



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NEPTUNE CHEMICAL FEED UNIT

JUST PIPE-IN . . .
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You'll get positive, accurate proportioning of chemicals when you use a NEPTUNE "packaged" chemical feed unit. That's because tank, agitator and pump are designed and built into one precisely-engineered chemical feed system. In addition to lower first cost and minimum upkeep, longer life is assured by 316 stainless steel piston, valves and bore checks.

- simply designed pump can be regulated easily to proportion exact quantities of chemical continuously
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Tank, agitator and pump are combined in one smooth operating system that precisely proportions anything from treating chemicals, such as calgon, to petroleum distillates.

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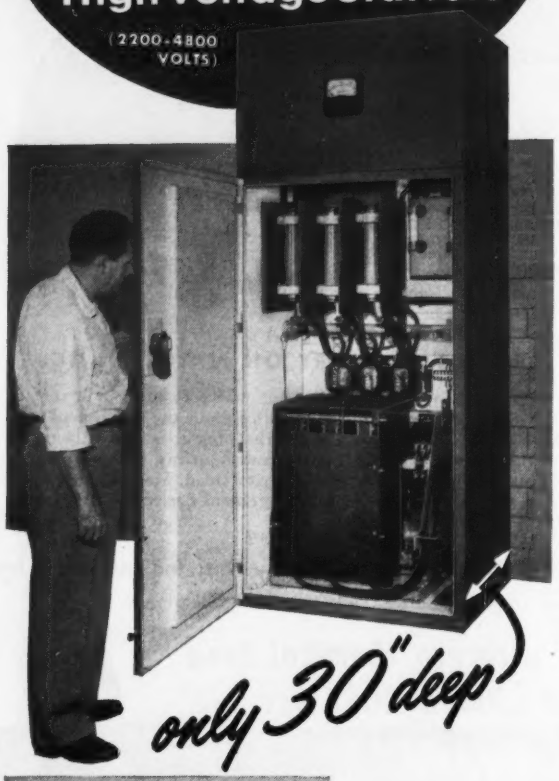
Save Space with New EC&M High Voltage Starters

(2200-4800 VOLTS)



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Accessible from Front...

(Solid back) • Starters may be mounted against wall or in double row, back to back

Safe...

Starter DISCONNECTED from bus as door is opened
Low voltage section isolated from high voltage

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against accidental closure by simple rod mechanism
Large wiring space for incoming leads

EC&M's new ZHA Starter not only saves valuable floor space—it provides more accessibility and convenience than ever before. Starters are available with self-contained bus in isolated compartment. A gang of starters requires only one incoming feeder. Additional starters can be added as needed—with no sacrifice in neat, streamlined appearance. All starters are self-contained and complete with control transformer supplying low voltage for pushbutton circuits.

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8175

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Kefauver-Patman Case

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what the proven effects of the discrimination. Furthermore, the Court held this to be true especially in situations where the discrimination is made to meet a competitor's lawful, non-discriminatory price.

Now what is meant by the phrase "good faith" as used in the Standard Oil ruling? The answer is, of course, arguable. Seemingly, however, the Court considered that the question of whether the discriminator showed "good faith" is merely a question whether he took proper steps to make sure that the competitor's lower price did, in fact, exist, before making the discrimination. In other words, "good faith" seems to mean that a seller does not act merely on a suspicion that a competitor is offering a lower price. And, of course, this has nothing to do with the purpose of the law, which is to maintain the competitive enterprise system. Obviously, "good faith" in this narrow sense is no safeguard against the destruction of competition — and indeed, the creation of monopoly — which may result from a discriminatory practice.

What the bills *do*

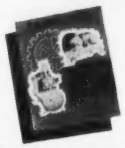
The purpose of H.R. 11 and S. 11 is to make our national objective of preserving a free, competitive enterprise system paramount over the seller's desire to discriminate in price. The bills say that "where the effect may be substantially to lessen competition or tend to create a monopoly", a discriminatory practice is not excused. Under these bills the Federal antitrust agencies will have the burden of proving the specified effects of a discriminatory practice as they now have.

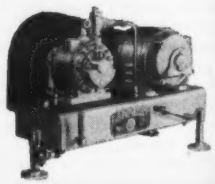
With reference to the above-quoted language, the point has been made that it leaves "uncertainty." It has been argued that the seller cannot know with precision just how far he can go in lessening competition before the lessening becomes "substantial" in the eyes of

Whatever You Need Vacuum For

You Can Get It For Less With a LAMMERT PUMP

Capacities from 4.3 to 225 cubic feet per minute. From medium to high vacuum (up to 20 microns of barometer).





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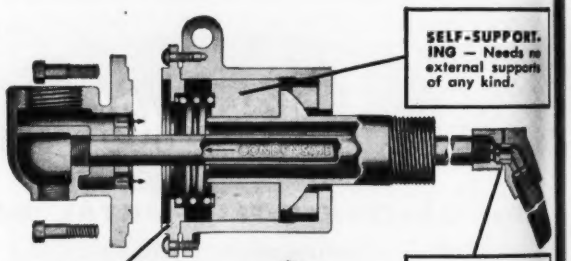
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ASSEMBLY PLATE — Holds internal parts in position when head is removed.
SYPHON ELBOW — Permits use of straight pipe for syphon. Can be inserted or withdrawn right through the joint.

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We will also assist your engineers in laying out jacketed pipe lines to give most efficient service at least cost. We've been engineering piping since 1872.

Stocks are maintained of jacketed valves and fittings in sizes from 1¼" to 8" and all sizes of pipe and flanges for your convenience.

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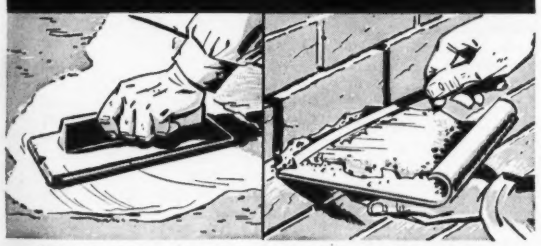

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the law. It could be pointed out, however, that this is the same language which has for many decades defined illegal exclusive-dealing contracts, and illegal tie-in sales, as prohibited by Section 3 of the Clayton Act. It is also the same language which defines an illegal merger under Section 7 of the Clayton Act.

Legislation of greater certainty could, of course, be drafted; and greater certainty would in all probability give the smaller firms a more nearly equal chance, and greater protection from their big competitor's abuse of power. The artificial advantages of bigness should be curbed at least as much as these bills would curb them. They are modest and reasonable bills, and it is hoped that management in the bigger corporations will not object to giving as much equality of opportunity to smaller firms as these bills provide. ■

Taxation

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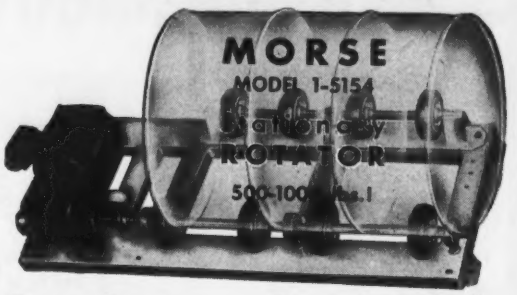
down, non-monetary incentives may be subject to the same kind of attack, for the question is not economic but philosophical. It is a state of mind.

Who can say that a national attitude which will countenance the confiscation of reward in one area will not, in time, be reflected in others to the end that the prize will lack its former luster, the rank and the titles lose their prestige, the acclaim rings hollow?

In a broad and general way, it seems to me that the role of government, in the economic area at least, is analogous to that of management of a large and diversified operation. And in this area, where most of us here at home, we recognize that our most compelling duty is to create that kind of environment in which people can and will give their best effort.

Maintenance of such an atmosphere for the country generally represents a prime responsibility. ■

HEAVY DRUM ROTATING



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for easy reading in any location

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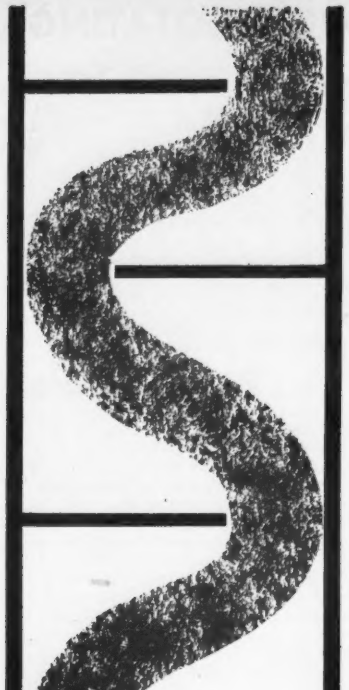

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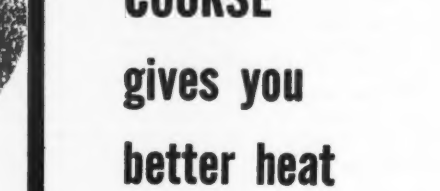

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Discussed in This Issue - - -

PROCESSES, EQUIPMENT and MATERIALS

Use this "quick-locator" when you want information on a specific type of process, equipment or material mentioned in the processing stories or the advertisements in this magazine. Everything discussed in this issue is given here, if you want more data you can write manufacturer direct . . . or turn to inside back cover and use the convenient "Information Request Slip." This is a special service provided by the publisher . . . no obligation or charge, of course. The publisher contacts the proper manufacturers for you—information comes to you direct.

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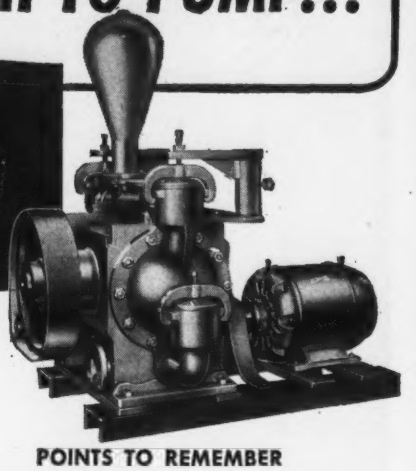

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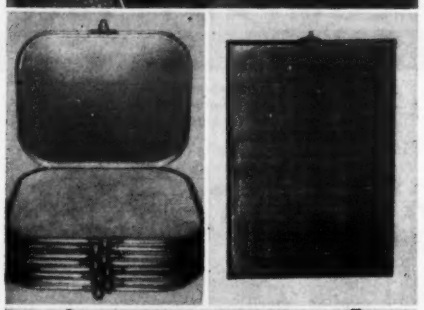

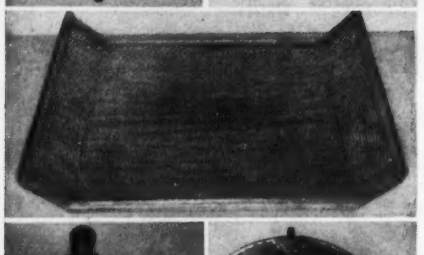

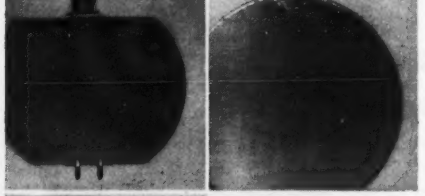

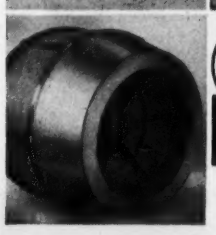

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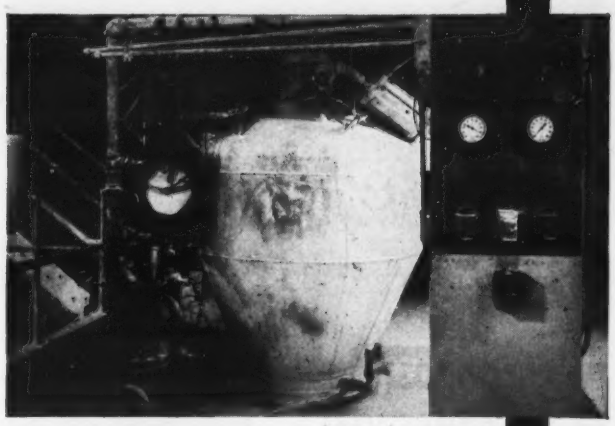

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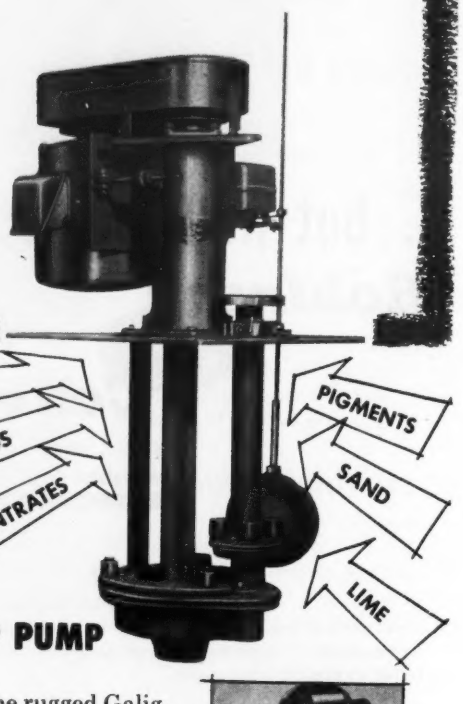

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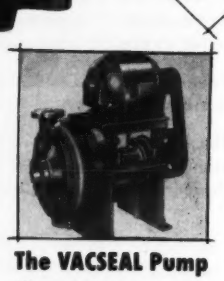

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How Foster Grant Co., Inc. Added More Steam in 6 Hours

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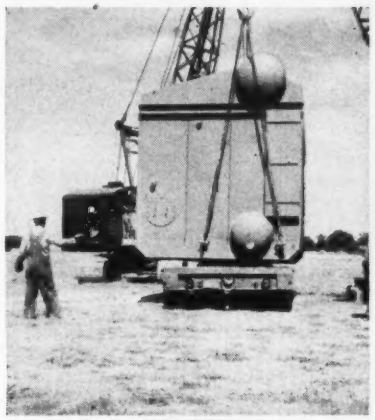

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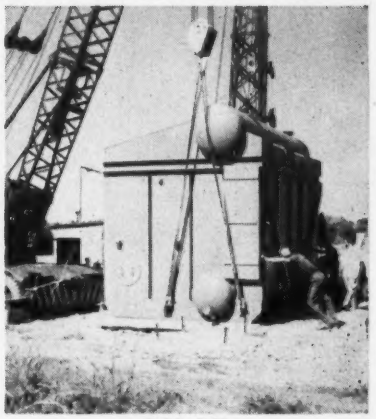

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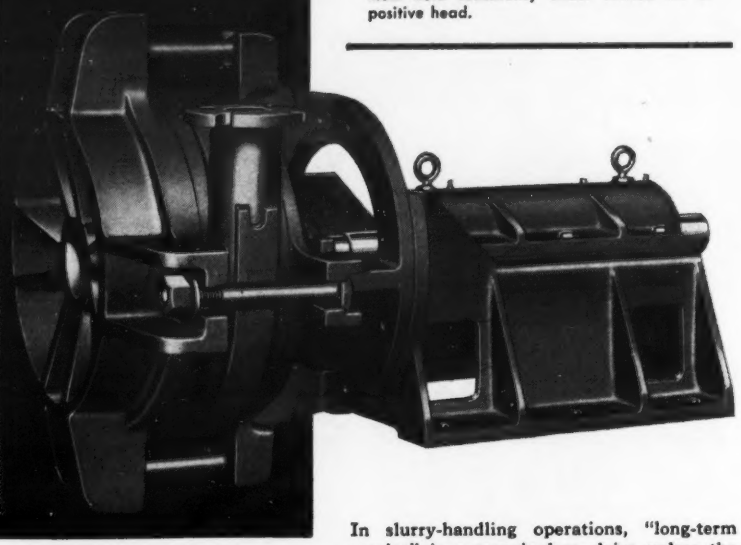

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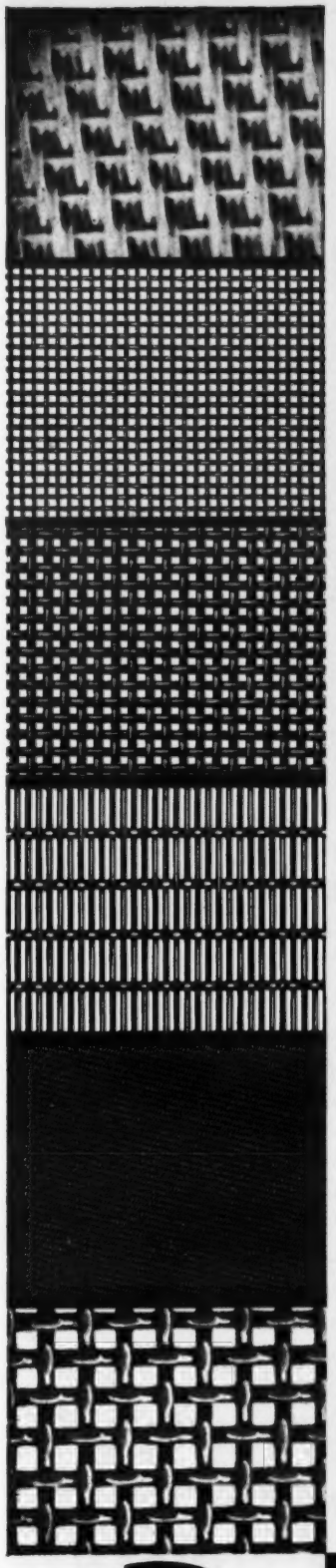

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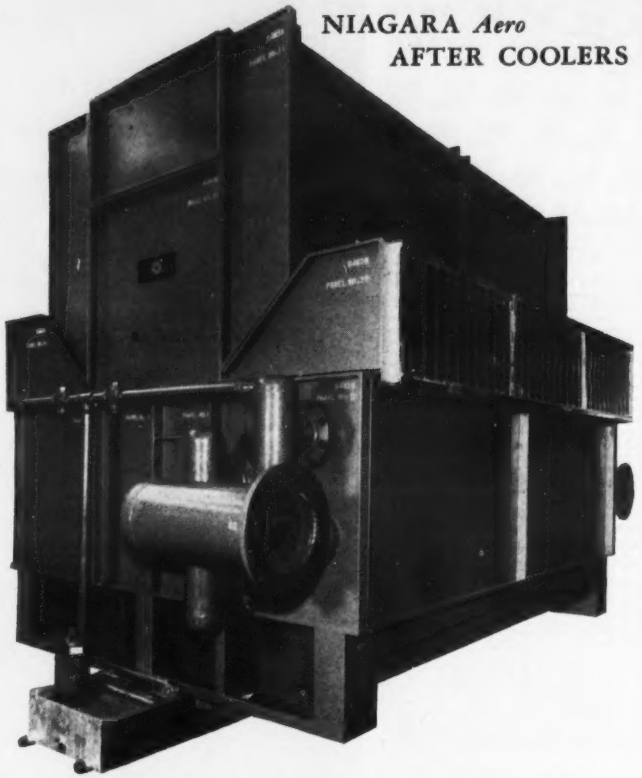

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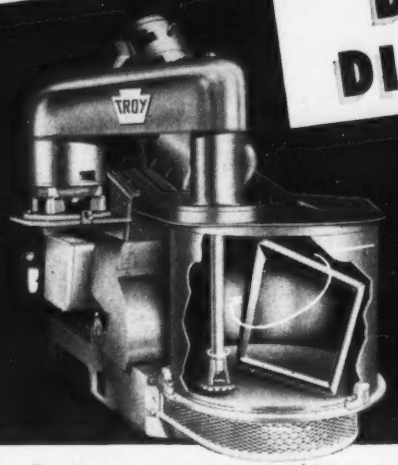

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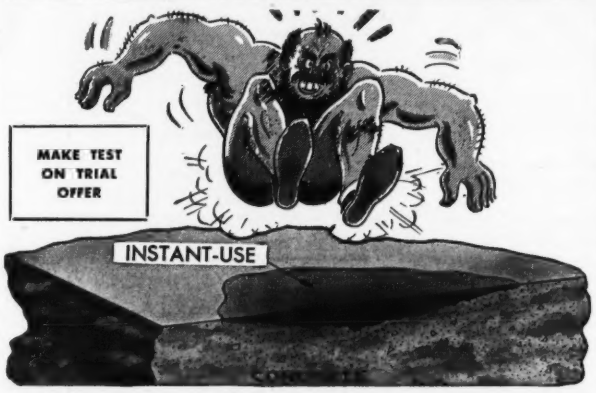

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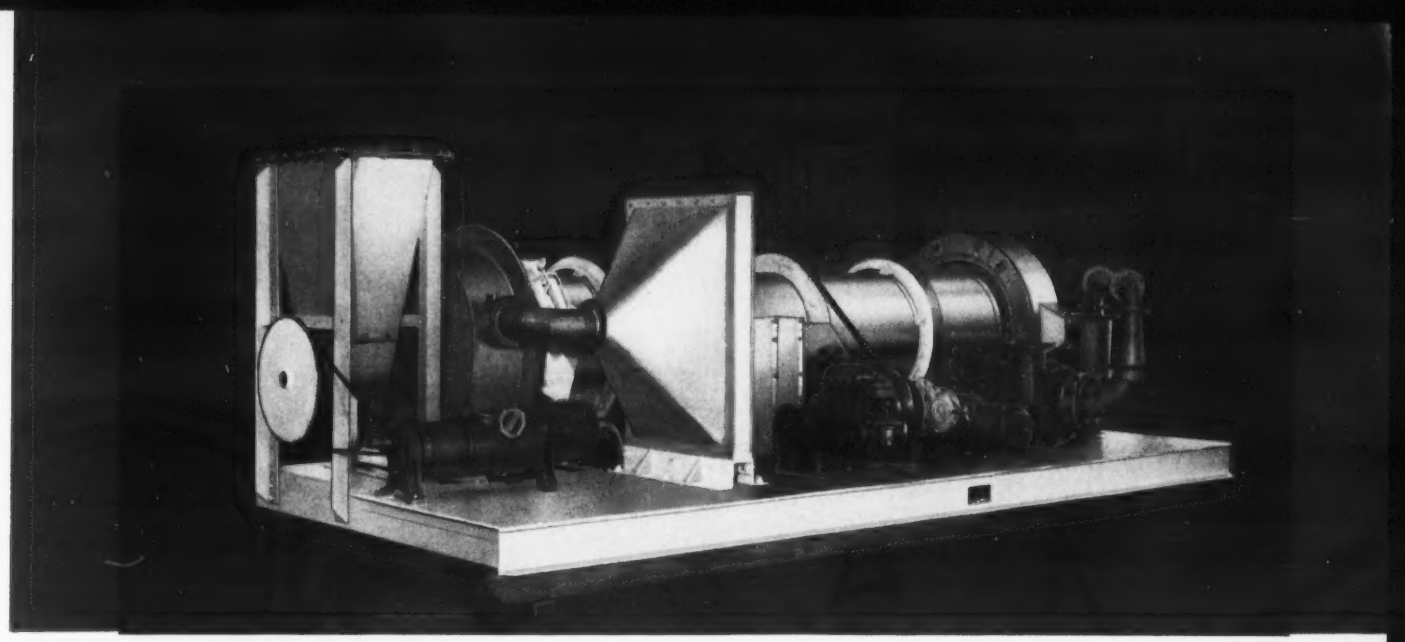

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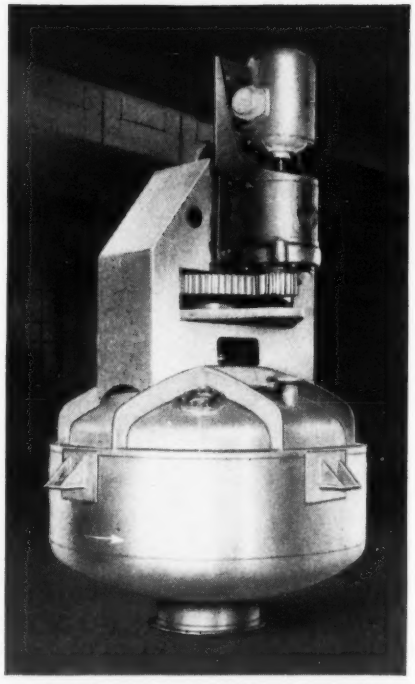

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The specially designed unit illustrated above, that removes an organic solvent from a costly anti-biotic, is typical of Bartlett-Snow's skillful and painstaking pharmaceutical construction. The interior of the unit, including the flights that lift the material and cascade it down through the heated air stream, is ground and sand blasted for quick and thorough cleaning. Feed hopper, variable speed screw feeder, heating coils, air blower, air sterilizer and cyclone dust collector are all mounted on the same frame to assure permanent alignment of all parts.

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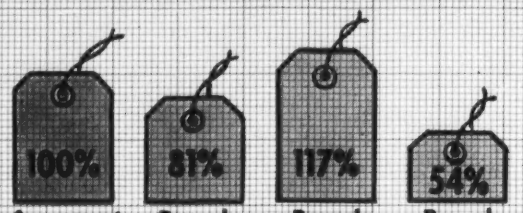
How price per gallon compares on leading vinyls



UNLESS YOU
compare mil sq. ft. per gallon and...

Sq. ft. coverage per gallon, 1 mil thick

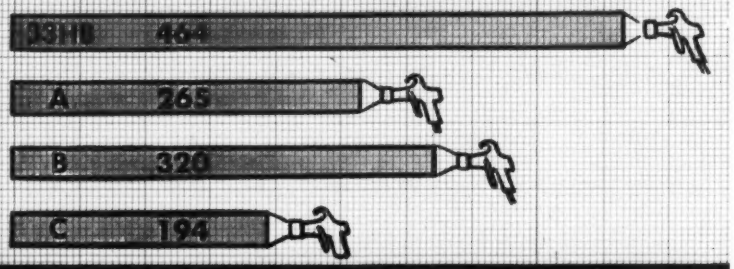


FIGURE THE
material cost of each coating, then get the...

Needed to coat 250 sq. ft. 5 mils thick

	GALS.	COST
33HB	2.68	$17.37
A	4.72	24.78
B	3.91	29.72
C	6.44	22.54

REAL COST
by adding labor for the number of coats needed.

Labor & material cost, 250 sq. ft. x 5 mils thick

33HB	$37.47
A	60.18
B	59.05
C	70.84

SERIES 102

Announcing...

A True High Build Vinyl Coating

Amercoat 33HB now gives you even *more* "mils per gallon" —and at the lowest cost of any leading vinyl!

At last, the two major limitations of vinyl protective coatings—critical adhesion and low film thickness—have been largely overcome. Amercoat 86 Primer stopped adhesion troubles, eliminated underfilm corrosion and undercutting, and simplified surface preparation. *Now Amercoat 33HB Topcoat builds thick films in fewer coats at surprising savings.*

Amercoat 33HB is a "high-build" version of Amercoat 33, the standard of the protective coatings industry for over ten years. 33HB gives you the same high resistance to corrosive chemicals, severe weathering and abrasion, *plus 33% greater thickness per coat!*

The solids content of 33HB tops all other non-mastic vinyl coatings, yet workable viscosity is retained. It applies smoothly and easily by hot or cold spray. No need to stock two types of materials.

New Lower Cost

In evaluating any coating, always look at the cost per square foot, and the number of coats required to build proper film thickness. 33HB is nearly 24% cheaper per mil square foot than traditionally low cost 33... and compared to other leading vinyls, (see chart) savings are even greater. For example, although the gallon price of Coating "C" is 46% lower than 33HB, because of its low solids content the actual *material* cost for 5 mils thickness is almost 30% higher than 33HB, and the applied cost, (labor and material) is almost 90% higher.

For the full story, send coupon for data on 33HB and detailed cost comparison of the four coatings on the chart.

Amercoat® CORPORATION

4809 Firestone Blvd. · South Gate, Calif.

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Please send me full information on Amercoat 33HB

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PENNSYLVANIA ..... Pittsburgh, Philadelphia
TENNESSEE ..... Memphis, Knoxville, Nashville
TEXAS ..... Houston, Dallas, Beaumont
UTAH ..... Salt Lake City
WASHINGTON ..... Seattle
WISCONSIN ..... Milwaukee, Green Bay
HAWAII ..... Honolulu
PUERTO RICO ..... Santurce

CANADA:

ALBERTA ..... Calgary, Edmonton
SASKATCHEWAN ..... Saskatoon
MANITOBA ..... Winnipeg
BRITISH COLUMBIA ..... Vancouver
NEW BRUNSWICK ..... St. John
ONTARIO ..... Fort William, Kirkland Lake, Windsor, London, Ottawa, Toronto
QUEBEC ..... Montreal, Quebec

FOREIGN:

CUBA ..... Havana
VENEZUELA ..... Caracas, Maracaibo
BELGIUM ..... Brussels
DENMARK ..... Copenhagen
FINLAND ..... Helsinki
HOLLAND ..... Eindhoven
NORWAY ..... Oslo
SWEDEN ..... Stockholm, Gothenburg
GERMANY ..... Rona
FRANCE ..... Paris
SWITZERLAND ..... Geneva
ITALY ..... Palermo
UNION OF SOUTH AFRICA ..... Johannesburg